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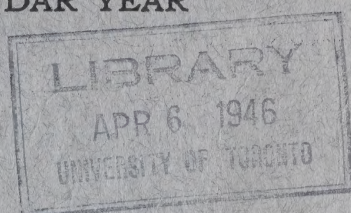
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CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR

1942



Published by Authority of the Hon. James A. MacKinnon, M.P.,
Minister of Trade and Commerce



OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1944

Price, \$1.00



CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

Dominion Bureau of Statistics
Mining, Metallurgical and Chemical Branch
Ottawa - Canada

E R R A T A

ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, 1942

Please substitute the following data for iron ore production:

<u>Page 53</u>			<u>Page 62</u>	
Year	Short tons	\$	Short tons	\$
1890			5,000	(x)
1909			263,893	653,808
1910			231,445	513,722
1911			175,586	446,326
1912			112,321	222,490
1913			195,680	427,975
1914			240,079	531,200
1915			394,429	766,166
1916			271,967	706,799
1917	17,189	54,815	198,113	703,301
1918	8,159	44,531	201,119	833,722
1919			195,649	686,381
1920			126,900	507,600
1921			58,499	227,134
1922			16,190	52,055
1923			30,447	113,543
1924			44	(x)
TOTAL ..	468,325	...	6,255,018	...

(x) Not recorded.

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PREFACE

Annual reports on the Mineral Production of Canada have been published since 1886. The first reports were published by the Geological Survey of Canada, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics.

The present report contains final data on the production of Canada's mines, together with details of capital employed in the industry, salaries and wages paid, the number of employees, the amounts expended on fuel and power, the power producing equipment installed, and the process supplies purchased. Bulletins on each industry are issued throughout the year and each chapter of the report is comprised of the essential features of each bulletin.

The 1932 edition contained a chronological record of principal mining events which had occurred up to that time. A decade has passed and it was thought advisable to bring this information up to date. To supplement this record, historical tables giving the annual production of each metal and industrial mineral for the Dominion and by provinces have been included also. By the use of the chronology and tables, a student of Canadian Mining History will be able to relate production data with discoveries and developments in the industry.

It has been the practice for years to include in this report world tables of all important minerals. No figures on world production have been available since 1939, but their publication will be resumed when world censorship regulations are lifted.

As in previous years, the Bureau co-operated with the Mines Departments of the provinces of Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia in the collection of these statistics. Forms are filled out in duplicate by the reporting companies, thereby saving the operator extra work, and resulting in uniform totals for Dominion and Provincial statistical bureaux.

The thanks of the Bureau are tendered to the Dominion Department of Mines and Resources and to the mine and smelter operators for assistance given and information made available. Railway and other transportation companies as well as smelter operators outside of Canada have also furnished data, the receipt of which is gratefully acknowledged.

The report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., Mining Statistician.

S. A. CUDMORE,

Dominion Statistician.

DOMINION BUREAU OF STATISTICS,

OTTAWA, February 8, 1944.

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DOMINION BUREAU OF STATISTICS

S. A. CUDMORE, M.A. (Oxon.), F.S.S., F.R.S.C., Dominion Statistician
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ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1942

CHAPTER ONE

The Canadian mining industry realized distinct annual increases in the value of its production for each year since the commencement of the second World War in 1939. In 1942 the value of Canadian mineral production totalled \$566,768,672, representing a 1.17 per cent increase over the previous all-time high record of \$560,241,290 in 1941. The value per capita of Canadian mineral production in 1942 was estimated at \$48.63.

This truly magnificent attainment during a period of world conflict reflects to a great extent the excellent co-operation experienced between the various wartime controllers and the mining industry as a whole. The request by the nation for an increase in output of strategic metals and minerals has been responded to by miners from coast to coast. Canada, in conjunction with the other allied nations, is now producing sufficient stocks of most of the mineral products essential for the successful prosecution of the war.

The value of metallic minerals and metals produced in the Dominion during 1942 totalled \$392,192,452, compared with \$395,346,581 in 1941. This decrease in value resulted largely from an increased curtailment in the mining of auriferous quartz ores. In 1942 all-time high records in output were established for nickel, lead, zinc, platinum metals, cadmium, mercury, tin, tungsten and magnesium. It is interesting to note that indium was produced commercially in Canada for the first time in 1942; the metal was recovered by the Consolidated Mining and Smelting Company of Canada Limited in its metallurgical plants located at Trail, B.C. In 1942 metallic magnesium was produced commercially for the first time in Ontario, production originating in the newly constructed plant of Dominion Magnesium Ltd., situated near Renfrew. Aluminium production in 1942 from imported ores was also the highest ever attained in the Dominion.

Production of fuels and other non-metallic minerals in 1942 amounted to \$128,846,413 as against \$119,521,437 in the preceding year. Compared with 1941, minerals in this major group to realize increases in quantity included coal, natural gas, petroleum, barite, fluorspar, peat moss, mica, salt, sodium sulphate and sulphur. Production of asbestos declined slightly from 1941, but the value showed a considerable increase. Gypsum shipments in 1942 from Nova Scotia quarries were severely restricted owing to the serious shortage in coastal shipping. An interesting event during the year under review was the commercial production for the first time in Canada of brucite granules. These were produced at Wakefield, Que., by the Aluminum Company of Canada Limited.

The value of products comprising structural materials and including clay products, cement, lime, stone and sand and gravel totalled \$45,729,807, a slight increase over the corresponding figure of \$45,373,272 in 1941. It might be presumed that wartime construction reached its peak in 1942, thus accounting for the relatively small increase in the output of building materials. The continued large consumption of lime and stone for chemical purposes reflected largely the enormous production of munitions of war.

Of the total value of Canadian mineral production in 1942, Ontario contributed \$259,114,946 or 45.7 per cent; Quebec, \$104,300,010 or 18.4 per cent and British Columbia, \$77,247,932 or 13.6 per cent.

Capital employed by the Canadian mining industry in 1942 totalled \$1,145,345,913. The industry as a whole provided employment to 112,043 persons and distributed \$198,550,260 in salaries and wages. Expenditures in 1942 by the industry for process supplies, fuel, electricity, outgoing freight and smelter treatment amounted to \$431,911,446. The labour stringency affected particularly metallic ore mining, notably gold. Employment in coal mining, on the whole, showed little change from 1941. Industries producing non-metallic minerals other than coal provided more employment than in 1941 or earlier years. Of the total of 354 strikes and lockouts throughout Canada in 1942, 61 were in mining, involving 19.7 per cent of the workers in all strikes. Fifty-three strikes were recorded in the coal mining industry and two in gold mining.

It is interesting to note that during 1942—

63 per cent of Canada's metal production came from mining areas discovered prior to 1910;
11 per cent came from areas discovered between 1910 and 1920;
21 per cent from areas discovered between 1920 and 1930;
5 per cent from areas discovered since 1930;

or

74 per cent came from areas discovered before 1920; and
95 per cent came from areas discovered before 1930.

It is therefore evident that, for at least ten or fifteen years, prospecting, discovery, and development have been inadequate to offset the exhaustion of known reserves.

Table 1.—Quantities and Values of Mineral Products from Canadian Sources, 1941 and 1942

		1941*		1942	
		Quantity	Value	Quantity	Value
METALLICS					
			\$		\$
Antimony.....	lb.	3,185,077	445,911	3,041,108	516,988
Arsenic (As ₂ O ₃).....	lb.	3,538,000	153,195	14,967,874	652,041
Bismuth.....	lb.	7,511	10,396	347,556	479,627
Cadmium.....	lb.	1,251,291	1,469,016	1,148,963	1,355,776
Chromite.....	ton	2,372	42,679	11,456	343,568
Cobalt.....	lb.	263,257	255,904	83,871	(d) 88,444
Copper.....	lb.	643,316,713	64,407,497	603,661,826	60,417,372
Gold valued at standard rate.....	fine oz.	5,345,179	110,494,653	4,841,306	100,078,674
Estimated exchange equalization on gold produced.....			95,294,739		86,311,607
Indium.....	fine oz.			471	4,710
Iron ore.....	ton	516,037	1,428,057	545,306	1,517,077
Lead.....	lb.	460,167,005	15,470,815	512,142,562	17,218,233
Magnesium.....	lb.	10,905	2,944	808,718	355,836
Manganese ore.....	ton			435	8,932
Manganese metal.....	lb.	7,500	2,250		
Mercury.....	lb.	536,304	1,335,697	1,035,914	2,943,807
Molybdenite concentrates.....	lb.	196,600	88,470	227,586	134,963
Nickel.....	lb.	282,258,235	68,656,795	285,211,803	69,998,427
Other precious metals.....	fine oz.		8,146,457		19,177,782
Pitchblende products.....	(a)		925,196	(a)	(a)
Selenium.....	lb.	406,930	777,236	495,369	951,108
Silver.....	fine oz.	21,754,408	8,323,454	20,695,101	8,726,296
Tellurium.....	lb.	11,453	18,394	11,084	17,735
Tin.....	lb.	64,744	33,667	1,237,863	643,689
Titanium ore.....	ton	12,651	49,110	10,031	50,906
Tungsten concentrates.....	lb.	82,846	38,712	520,981	406,275
Zinc.....	lb.	512,381,636	17,477,337	580,257,373	19,792,579
Total.....			395,346,581		392,192,452

Table 1.—Quantities and Values of Mineral Products from Canadian Sources, 1941 and 1942—Concluded

	1941*		1942	
	Quantity	Value	Quantity	Value
		\$		\$
Non-METALLICS—FUELS				
Coal..... ton	18,225,921	58,059,630	18,865,030	62,897,581
Natural gas..... M cu. ft.	43,495,353	12,665,116	45,697,359	13,301,655
Peat..... ton	355	2,155	172	1,204
Petroleum, crude..... brl.	10,133,838	14,415,096	10,364,796	15,968,851
Total.....		85,141,997		92,169,291
OTHER NON-METALLICS				
Asbestos..... ton	477,846	21,468,840	439,459	22,663,283
Barite..... ton	6,890	74,416	19,667	188,144
Diatomite..... ton	344	9,935	365	9,088
Feldspar..... ton	26,040	244,284	22,270	213,941
Fluorspar..... ton	5,534	97,767	6,199	146,039
Garnet rock..... ton	16	160	17	176
Graphite..... ton		132,924		117,904
Grindstones..... ton	188	11,500	216	10,000
Gypsum..... ton	1,593,406	2,248,428	566,166	1,254,182
Iron oxides (ochre)..... ton	10,045	142,069	9,304	151,653
Magnetite dolomite and brucite (e)..... ton		831,041		1,059,374
Magnesium sulphate..... ton	265	7,343	1,140	38,780
Mica..... ton	1,744	335,288	3,010	383,567
Mineral waters..... Imp. gal.	181,064	72,531	157,085	74,505
Nepheline syenite..... ton		227,588		246,893
Peat moss..... ton	27,803	644,253	53,506	1,069,372
Phosphate..... ton	2,487	33,376	1,264	17,431
Quartz..... ton	2,052,878	1,366,187	1,738,174	1,538,162
Salt (b)..... ton	560,845	3,196,165	653,672	3,844,187
Silica brick..... M	4,111	238,433	4,273	263,006
Soapstone (c)..... ton	16,461	155,925	14,369	136,529
Sodium carbonate..... ton	186	1,488	256	2,048
Sodium sulphate..... ton	115,608	931,554	131,258	1,079,692
Strontium minerals..... ton	27	280		
Sulphur**..... ton	260,023	1,702,786	303,714	1,994,891
Talc..... ton	18,171	204,884	15,499	174,295
Total.....		34,379,440		36,677,122
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS				
Clay Products— Total.....		7,575,336		7,081,723
OTHER STRUCTURAL MATERIALS				
Cement..... brl.	8,263,711	13,063,588	9,126,041	14,365,237
Lime (b)..... ton	880,885	6,357,941	884,830	6,530,839
Sand and gravel..... ton	31,604,806	10,375,723	26,349,907	9,005,414
Stone (b)..... ton	7,940,801	8,000,684	7,978,066	8,746,594
Total.....		37,797,936		38,648,084
Grand Total in Canadian Funds.....		560,241,290		566,768,672

* Unless otherwise noted, all total values of mineral production from 1931 to 1942, inclusive, contain estimated exchange equalization on gold produced.

**Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Data not available for publication.

(b) Includes relatively large quantities used as a chemical material.

(c) Includes some talc.

(d) Exclusive of ore placed on government stock pile at Deloro, Ontario.

(e) Brucite included only in 1942.

1 Ton = 2,000 lb.

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1942

		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
METALLICS												
Antimony.....	lb	.....	.....	.....	.....	.....	.....	.....	3,041,030	.....	78	3,041,108
Arsenic (As ₂ O ₃) (x).....	\$	.....	.....	6,349,074	1,504,049	.....	.....	.....	516,975	.....	13	516,988
Bismuth.....	lb	.....	.....	428,562	152,331	.....	.....	.....	7,114,751	.....	.....	14,967,874
.....	lb	.....	.....	.....	2,383	.....	.....	.....	71,148	.....	.....	652,041
Cadmium.....	lb	.....	.....	.....	3,219	.....	.....	.....	345,223	.....	.....	347,556
.....	lb	.....	.....	.....	.....	29,236	147,314	.....	476,408	.....	.....	479,627
Chromite.....	ton	.....	.....	.....	.....	34,498	173,831	.....	972,413	.....	.....	1,148,963
.....	ton	.....	.....	.....	.....	.....	.....	.....	1,147,447	.....	.....	1,355,776
Cobalt.....	lb	.....	.....	343,558	(a)	83,871	.....	.....	.....	.....	.....	11,456
.....	lb	.....	.....	.....	88,444	.....	.....	.....	.....	.....	.....	343,568
Copper.....	\$	.....	.....	.....	.....	.....	.....	.....	50,015,521	.....	.....	88,444
.....	lb	.....	.....	140,911,876	308,282,414	47,595,586	56,781,466	.....	74,963	.....	.....	603,661,826
.....	lb	.....	.....	14,212,372	30,625,404	4,800,491	5,738,970	.....	7,561	.....	.....	69,417,372
Gold.....	fine oz.	12,989	.....	1,092,388	2,763,819	136,226	178,871	34	5,044,865	.....	83,246	4,841,306
.....	oz.	500,076	.....	42,056,938	106,407,032	5,244,701	6,886,533	1,309	18,262,052	.....	3,204,971	186,399,281
Indium.....	oz.	.....	.....	.....	.....	.....	.....	.....	471	.....	.....	471
Iron ore.....	ton	.....	.....	187	545,119	.....	.....	.....	4,710	.....	.....	4,710
.....	ton	.....	.....	.....	1,516,142	.....	.....	.....	.....	.....	.....	545,306
Lead.....	lb	.....	.....	935	.....	.....	.....	.....	.....	.....	.....	1,317,077
.....	lb	.....	.....	437,634	3,183,159	.....	.....	.....	507,199,704	.....	1,322,065	512,182,862
Magnesium.....	lb	.....	.....	14,713	107,018	.....	.....	.....	17,052,054	.....	44,448	17,218,333
.....	lb	.....	.....	141,081	473,910	.....	.....	.....	193,727	.....	.....	308,718
Manganese ore.....	ton	61	374	62,076	208,520	.....	.....	.....	85,240	.....	.....	359,536
Manganese metal.....	ton	91	8,841	.....	.....	.....	.....	.....	.....	.....	.....	435
Mercury.....	lb	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,932
Molybdenite (concentrates).....	lb	.....	.....	.....	.....	.....	.....	.....	1,035,914	.....	.....	1,035,914
.....	lb	.....	.....	222,276	423	.....	.....	.....	2,043,907	.....	.....	2,943,807
Nickel.....	lb	.....	.....	131,908	150	.....	.....	.....	4,887	.....	.....	2,927,586
.....	lb	.....	.....	.....	285,211,803	.....	.....	.....	2,907	.....	.....	134,963
Other precious metals.....	fine oz.	.....	.....	69,998,427	.....	.....	.....	.....	.....	.....	.....	285,211,803
Pitchblende products.....	ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69,998,427
Selenium.....	lb	.....	.....	326,208	76,000	21,209	71,952	.....	1,528	(b)	.....	19,177,782
.....	lb	.....	.....	626,319	145,920	40,721	.....	.....	.....	.....	.....	495,569
Silver.....	fine oz.	446	.....	1,685,042	4,452,787	821,824	2,694,132	2	10,596,204	22,531	482,133	951,103
.....	oz.	188	.....	697,865	1,877,562	346,330	1,123,358	1	4,467,996	9,500	203,296	20,695,101
Tellurium.....	lb	.....	.....	.....	9,500	.....	.....	.....	.....	.....	.....	8,724,296
.....	lb	.....	.....	.....	1,223	.....	.....	.....	.....	.....	.....	11,984
Tin.....	lb	.....	.....	16,200	578	.....	1,957	.....	.....	.....	.....	17,735
.....	lb	.....	.....	.....	.....	.....	.....	.....	1,237,863	.....	.....	1,237,863
.....	\$	.....	.....	.....	.....	.....	.....	.....	643,689	.....	.....	643,689

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1942—Continued

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
Non-Metals—Concluded											
Other Non-Metallic and Industrial Minerals— Concluded											
Mica (all grades).....			2,657,044	2,800,627				562,000			6,019,671
Mineral waters.....			285,263	89,243				9,061			383,367
Imp. gal.			129,062	28,023							157,085
Nonpheline syenite.....			60,316	14,189							74,505
Peat moss.....		295		246,893							256,593
ton		8,100	12,982	9,427	2,224		58	28,520			36,906
Phosphate.....			197,560	147,729	55,832		1,380	658,771			1,069,362
ton			930		334						1,069,362
Quartz.....			12,973	4,458							17,431
ton	10,708		203,219	1,367,733		155,699		815			1,737,171
Salt.....	23,567		543,817	914,256		54,405		2,037			1,538,162
ton	5,689			558,407	22,706		22,360				1,653,672
Silica brick.....	317,798			2,793,328	397,101		335,990				3,814,157
M	3,000			1,183							4,273
Soapstone (inc. talc).....	142,511			120,495							263,006
ton			14,369								14,369
Sodium carbonate.....			136,328					256			136,329
ton								2,048			256
Sodium sulphate.....						131,258					131,258
ton			168,832	18,634		1,079,692		116,248			1,079,692
Sulphur.....			673,965	186,340				1,134,586			303,714
ton				2,469							1,994,591
Talc.....				174,295							15,499
ton											174,295
Total Other Non Metals.....	1,181,813	129,416	25,944,717	5,276,786	632,713	1,134,157	337,340	2,040,150			36,477,122
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS											
CLAY PRODUCTS											
Clay—Pentonite.....	2,689			390	38,800		5,404				44,204
Fireclay.....	9,129			1,911			1	1,243			5,601
ton							8	16,965			40,722
Kaolin.....			408								408
ton			6,130								6,130
Other clay.....				4,706		20,097					24,803
ton				3,533		68,293					71,826
Fireclay blocks and shapes.....	741	2,296				178,129		29,080			210,246

(a) Less value of containers.

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1942—Concluded

—	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—Concluded											
OTHER STRUCTURAL MATERIALS—Concluded											
Stone—Granite.....ton	429	964	1,178,765	90,530	133	.....	.....	95,604	.....	.....	1,366,425
.....\$	41,985	29,334	1,449,840	288,828	2,452	.....	.....	133,810	.....	.....	1,946,249
Limestone (*).....ton	185,232	82,623	2,926,964	2,992,835	43,355	.....	12,028	199,436	.....	.....	6,442,583
.....\$	645,680	281,296	2,565,029	2,636,431	69,514	.....	40,436	230,139	.....	.....	6,468,525
Marble.....ton	.....	.....	9,429	4,295	.....	.....	.....	100	.....	.....	13,824
.....\$	.....	.....	58,714	27,675	.....	.....	.....	1,820	.....	.....	88,209
Sandstone.....ton	43,856	4,350	72,894	18,835	.....	.....	.....	13,930	.....	.....	133,865
.....\$	76,502	10,650	92,724	33,004	.....	.....	.....	13,930	.....	.....	226,810
Slate.....ton	.....	.....	158	.....	.....	.....	.....	1,211	.....	.....	1,369
.....\$	.....	.....	.....	.....	.....	.....	.....	16,643	.....	.....	16,801
Total stone.....ton	229,517	87,937	4,188,210	3,105,545	43,488	.....	12,028	310,341	.....	.....	7,978,066
.....\$	764,167	321,280	4,166,465	2,985,938	71,966	.....	40,436	396,342	.....	.....	8,746,594
Total Other Structural Materials \$	1,362,471	1,059,302	15,463,103	13,543,792	2,138,693	435,798	1,722,463	2,922,462	.....	.....	38,648,084
Grand Total.....\$	32,783,165	3,099,158	104,300,010	259,114,946	14,345,046	20,578,749	47,359,831	77,247,932	3,976,267	3,453,568	566,768,672
Metallics.....\$	504,322	8,841	61,150,893	230,627,535	11,438,987	16,931,789	1,310	64,157,752	3,867,455	3,453,568	392,192,452
Fuels.....\$	29,116,118	2,165,558	7,117,347	7,117,347	3,763	1,805,650	44,285,221	7,566,822	108,812	.....	92,169,291
Other non-metals.....\$	1,181,813	129,416	25,944,717	5,276,786	632,713	1,134,187	337,340	2,040,150	.....	.....	36,677,172
Clay products.....\$	618,041	246,041	1,741,297	2,549,486	80,890	271,325	1,013,467	560,746	.....	.....	7,081,723
Other structural materials.....\$	1,362,471	1,059,302	15,463,103	13,543,792	2,138,693	435,798	1,722,463	2,922,462	.....	.....	38,648,084
Grand Total—1942.....\$	32,783,165	3,099,158	104,300,010	259,114,946	14,345,046	20,578,749	47,359,831	77,247,932	3,976,267	3,453,568	566,768,672
Per cent of total.....	5.78	0.64	18.40	45.72	2.53	3.63	8.36	13.63	0.70	0.61	100.00
Grand Total—1941.....\$	32,569,867	3,090,375	99,651,044	267,435,727	16,689,867	15,020,555	41,364,385	76,841,190	3,860,298	3,117,992	509,241,290
Grand Total—1940.....\$	33,318,587	3,435,916	86,313,491	261,483,349	17,828,522	11,505,558	35,092,337	74,134,455	2,594,157	4,118,333	529,825,635

(*) Includes relatively large quantities used as a chemical.

Table 3.—Revised Monthly Production of Principal Minerals in Canada, 1942

—	Asbestos	Cement	Clay Products	Coal	Copper	Feldspar	Gold	Gypsum	Lead	Lime	Natural Gas	Nickel	Petroleum	Salt	Silver	Zinc
	tons	barrels	\$	tons	pounds	tons	fine ounces	tons	pounds	tons	M cu. ft.	pounds	barrels	tons	fine ounces	pounds
January.....	31,215	282,862	389,659	1,919,264	51,722,951	1,528	409,134	75,218	40,046,125	72,145	5,395,065	23,782,255	875,827	47,204	1,611,695	47,027,869
February.....	32,346	298,799	331,571	1,712,029	48,970,425	1,438	378,844	52,508	39,038,625	65,736	4,867,771	22,343,149	846,189	47,652	1,548,633	43,203,703
March.....	36,692	399,201	508,237	1,610,242	55,972,510	1,527	442,962	60,258	41,681,881	73,039	4,654,461	24,553,702	923,177	48,489	1,682,211	47,933,913
April.....	32,589	618,742	513,308	1,523,885	52,071,710	1,503	424,396	75,165	44,569,901	73,072	3,826,085	23,907,023	846,737	49,198	1,690,495	48,764,184
May.....	37,859	788,344	614,027	1,316,863	51,910,329	1,857	428,798	73,658	47,552,134	73,220	3,202,569	24,259,263	892,207	59,736	1,701,502	48,773,593
June.....	39,053	1,074,710	714,324	1,386,453	50,541,392	2,078	427,982	38,317	42,885,117	73,339	2,458,302	24,298,658	856,912	56,214	1,610,420	46,063,524
July.....	39,375	1,245,588	750,039	1,497,197	49,392,824	2,038	428,323	56,624	36,611,066	72,760	2,318,638	24,765,200	869,201	59,633	2,060,064	47,285,323
August.....	42,020	1,230,065	740,162	1,468,448	50,904,328	1,996	406,315	27,011	41,455,245	74,926	2,389,244	23,801,716	870,275	51,499	1,576,828	48,092,557
September.....	37,055	1,092,781	666,901	1,469,691	49,789,764	1,936	380,703	21,685	44,144,152	75,132	3,000,431	23,217,671	827,025	57,411	1,842,007	47,455,979
October.....	40,416	1,144,153	751,842	1,574,871	48,716,916	2,130	385,111	27,191	45,549,537	78,940	3,503,803	23,026,471	860,060	57,381	1,959,272	52,200,779
November.....	38,456	621,749	648,017	1,646,387	47,198,844	2,191	365,755	31,098	45,894,806	78,947	4,642,666	21,499,988	838,511	63,660	1,700,111	50,283,756
December.....	32,383	329,047	453,036	1,739,700	46,559,542	2,048	362,983	27,433	42,714,173	73,574	5,378,324	25,756,677	858,675	55,595	1,711,863	52,572,193
Calendar Year.....	439,459	9,126,041	7,081,723	18,865,030	603,661,826	22,270	4,841,306	566,166	512,142,562	884,830	45,697,359	285,211,803	10,364,796	653,672	20,695,101	580,257,373

Table 4.—Average Yearly Prices for Metals, 1938-1942

Metal	Market	Unit	1938	1939	1940	1941	1942
			\$	\$	\$	\$	\$
Antimony (ordinaries).....	New York.....	Pound....	0-12349	0-12359	0-14000	0-14000	0-15559
Arsenic, white (nominal).....	New York.....	Pound....	0-03000	0-03	0-035	0-040	0-040
	New York.....	Pound....	0-1000	0-10965	0-11296	0-11797	0-11775
Copper.....	Montreal.....	Pound....	0-1055	0-1077	0-115	0-115	0-115
	London.....	Long ton..	45-411	49-169	(a)	(a)	(a)
Gold (in Canadian funds).....		Fine oz....	35-175	36-141	38-50	38-50	38-50
	New York.....	Pound....	0-0474	0-0505	0-0518	0-05793	0-06481
Lead.....	Montreal.....	Pound....	0-04176	0-04235	0-05	0-05	0-05
	London.....	Long ton..	15-266	15-437	(a)	(a)	(a)
Nickel.....	New York.....	Pound....	0-35	0-35	0-35	0-35	0-35
Platinum (in Canadian funds)...	London.....	Fine oz....	32-213	35-074	39-086	38-210	38-21
Silver.....	New York.....	Fine oz....	0-43225	0-39082	0-34773	0-34783	0-38333
Tin.....	New York.....	Pound....	0-42301	0-50323	0-49827	0-52018	0-5200
	St. Louis.....	Pound....	0-0461	0-0511	0-06335	0-07474	0-08250
Zinc.....	Montreal.....	Pound....	0-039	0-0468	0-052	0-0515	0-0515
	London.....	Long ton..	13-990	14-950	(a)	(a)	(a)

NOTE.—All prices in dollars per unit excepting London copper, lead and zinc prices which are quoted in pounds sterling per long ton.

(a) No quotations.

The agreement made in 1939 by the large Canadian base metal producers and the Imperial Government, by which the producers were to supply the Imperial Government with copper, lead and zinc at prices which prevailed shortly before the outbreak of war, was continued with some adjustments or revisions for increases in prices due to the increased cost of labour and materials. Canada can now furnish large quantities of these metals in the refined state, whereas in 1914 no refined copper, nickel or zinc and only a comparatively small amount of refined lead were produced in this country.

Table 5.—Metal Prices by Months 1941 and 1942

Month	Copper* (electrolytic) New York (cents per pound) †		Pig Lead* New York (cents per pound)		Silver				Zinc* St. Louis (cents per pound)	
					New York (cents per oz.) (0-999 fine)		London (pence per oz.) (0-925 fine)			
	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941
January.....	11-775	11-819	6-275	5-500	35-125	34-750	23-500	23-273	8-250	7-250
February.....	11-775	11-794	6-500	5-602	35-125	34-750	23-500	23-341	8-250	7-250
March.....	11-775	11-814	6-500	5-765	35-125	34-750	23-500	23-446	8-250	7-250
April.....	11-775	11-820	6-500	5-850	35-125	34-750	23-494	23-500	8-250	7-250
May.....	11-775	11-815	6-500	5-850	35-125	34-750	23-500	23-457	8-250	7-250
June.....	11-775	11-810	6-500	5-850	35-125	34-750	23-500	23-400	8-250	7-250
July.....	11-775	11-812	6-500	5-850	35-125	34-750	23-500	23-397	8-250	7-250
August.....	11-775	11-778	6-500	5-850	35-125	34-750	23-500	23-459	8-250	7-250
September.....	11-775	11-775	6-500	5-850	44-750	34-750	23-500	23-500	8-250	7-250
October.....	11-775	11-775	6-500	5-850	44-750	34-750	23-500	23-500	8-250	7-942
November.....	11-775	11-775	6-500	5-850	44-750	34-772	23-500	23-500	8-250	8-250
December.....	11-775	11-775	6-500	5-850	44-750	35-125	23-500	23-500	8-250	8-250
Average.....	11-775	11-797	6-481	5-793	38-333	34-783	23-500	23-439	8-250	7-474

* No London quotations for 1942 or 1941. Montreal quotations remained constant throughout 1942 and 1941 at: copper 11-5 cents; lead 5 cents and zinc 5-2 cents.

Transposed into Canadian funds the average price of copper, based on the London market, was 10-086 cents per pound in 1942 and 1941; the average price of lead based on the same market was 3-362 cents per pound in 1942 and 1941. The average price of zinc in Canadian funds based on the London market in both 1942 and 1941 was 3-411 cents per pound. The average price of silver in Canadian funds, based on the New York market, was 42-166 cents per fine ounce in 1942 and 38-261 cents in 1941.

† f.o.b. refinery. United States prices from Engineering and Mining Journal, New York.

TABLE 6—CHRONOLOGICAL RECORD OF CANADIAN MINING
EVENTS, 1604—1943.

- Year
- 1604—Discovery of iron and silver reported at St. Mary's Bay, Nova Scotia, by Master Simon, a mining engineer accompanying Champlain. Native copper was also reported to have been found at Cap d'Or.
- 1612—Sir Thomas Button entered Nelson River.
- 1654—Louis XIV granted a concession to Nicholas Denys to mine gold, silver, copper and other minerals on Cape Breton Island.
- 1672—Nicholas Denys reported the discovery of coal on Cape Breton Island.
- 1677—Intendant of New France, M. Duchesneau, proclaimed the imposition of a royalty of 20 sous per ton on coal mined in Cape Breton.
- 1711—Admiral Walker obtains coal in Cape Breton.
- 1720—First coal produced in Canada by regular mining methods on north side of Cow Bay, Cape Breton, N.S.
- 1724—Coal was exported from Cape Breton to Boston.
- 1732—La Verendrye reached Lake Winnipeg.
- 1737—Iron ores smelted on St. Maurice river, Quebec, by Cugnet & Cie or "La Compagnie des Forges."
- 1744—Publication of Bellin's map showing existence of silver-lead ores on Lake Temiskaming, Quebec, now known as the Wright mine.
- 1754—Hendry reached Saskatchewan River from Hudson Bay.
- 1770—Jesuit Fathers experimented with native copper found at Point Mamainse, north shore Lake Superior.
- Alexander Henry, English trader, formed a mining company, in which the Duke of Gloucester and other prominent Englishmen were partners, to develop minerals near Sault Ste. Marie, Ontario.
- 1771—Samuel Hearne, Hudson's Bay clerk, prospects the Copper Mine River area, Northwest Territories, for copper.
- 1779—Earliest recorded gypsum mining operations by settlers, Nova Scotia.
- 1782—Coal mined in vicinity of Grand Lake, New Brunswick.
- 1784—Government commenced systematic coal mining on northwest shore of Sydney Harbour, N.S.
- 1789—Sir Alex. MacKenzie discovers coal on Great Bear River, Northwest Territories.
- 1800—First iron furnace in Ontario erected in Leeds county at Furnace Falls (Lyndhurst) by D. Sherwood, S. Barlow, W. Sutherland and E. Jones.
- David Thompson discovers coal on Saskatchewan river.
- 1813—Blast furnace erected by John Mason at Normandale, Norfolk county, Ontario, used unsuccessfully in treating bog ores.
- 1820—Blast furnace erected in Marmora twp., Hastings county, Ontario, by Mr. Hayes.
- 1822—First record of gypsum mining in Ontario, near Paris.
- Normandale iron furnace commenced successful iron smelting operations in Ontario under Mr. Van Norman.
- 1823—Placer gold discovered on Chaudière River, Quebec, by a woman.
- First gypsum mill operated in Ontario.
- 1826—General mining association formed in Nova Scotia.
- 1829—Lièvre river apatite deposits in Quebec discovered.
- 1830—First mining shaft in Nova Scotia sunk on Sydney main coal seam.
- 1835—Coal discovered at Suquash, Vancouver Island, through information supplied by Indians.
- 1840—First hydraulic cement made in Canada at Hull, Quebec.
- 1843—Geological Survey of Canada instituted under Sir Wm. Edmund Logan.
- 1846—Silver veins reported in vicinity of Thunder Bay, Lake Superior.
- Ascanio Sobrero, Italian, first makes nitroglycerine.
- Oil seepages reported on Gaspé Peninsula by Sir Wm. Logan.
- 1847—Normandale iron furnace in Ontario shut down owing to lack of ore and fuel.
- First mention of copper ores in Eastern Townships, Quebec, in Geological report, 1847-48.
- Gypsum mining operations commenced near Hillsborough, New Brunswick.
- 1848—Montreal Mining Company commenced mining at Bruce Mines, Ontario.
- 1850—Indians located Douglas coal seam at Nanaimo, B.C.
- 1852—August 24, J. W. McKay, Hudson's Bay Co. factor sent by James Douglas from Victoria to take possession of Nanaimo coal field and collect royalty from users of coal.
- Free gold discovered in quartz at Mitchell harbour, Queen Charlotte Islands, causing the first auriferous quartz rush in British Columbia.
- 1853—March 26. Governor Douglas, Victoria, issued, as Lieutenant Governor of Queen Charlotte Islands, Crown Colony, the first proclamation relating to mining in British Columbia.
- 1855—Placer gold found at the mouth of Pend d'Oreille River, B.C., by ex-servants of the Hudson's Bay Company at Fort Colville.

- 1857—Sir James Hunter located coal on Souris river, Manitoba.
Placer gold reported at the junction of the Fraser and Thompson rivers, B.C.
December 28. James Douglas issued proclamation regarding working of gold mines located chiefly in the Kamloops, Ashcroft, and Vernon areas of British Columbia.
- 1858—Introduction of Canadian decimal currency.
Legislature of Nova Scotia obtained possession and control of mines and minerals of province.
First producing oil well on American continent opened in Lambton county, Ontario.
Discovery of placer gold in the lower reaches of the Fraser river, B.C., caused rush to Yale, Hope and Canyon by miners from California and other foreign parts.
- 1859—Passage of the Goldfields Act, British Columbia, Sept. 7.
Placer miners penetrate to Cariboo and Quesnel, B.C.
Canadian silver coinage issued.
- 1860—John Pulsiver discovered gold in Tangier district, Halifax county, N.S.
First drilling for oil in Gaspé, Quebec.
Pete Toy bar discovered at the Parsnip and Findlay rivers, B.C.
Crushing plant erected at Wellington Copper Mine, Ontario.
- 1861—Gold discovered in Oldham district, Halifax county, N.S.
- 1862—Gold discovered in Lawrencetown, Isaacs Harbour and Renfrew districts, N.S.
- 1863—Miners from State of Washington ascending the Kootenay, established Wildhorse Creek diggings, B.C.
Issue of a comprehensive Geology of Canada under Sir William Logan.
- 1864—Placer gold located on Leech Creek, B.C.
Copper claims staked on Howe Sound and Knight Inlet.
- 1865—Dewdney trail completed to Wildhorse from Hope, B.C., to enable gold escorts to reach Victoria on British territory.
Placer claims staked on Big Bend area of Columbia river, B.C., by former Cariboo miners.
Gold discovered in Mount Uniacke district, Nova Scotia.
Eustis mine opened in Eastern Townships, Quebec.
- 1866—First discovery of gold in Canadian Pre-Cambrian shield near Madoc, Hastings county, Ontario, known as Richardson mine, made by a Dutch prospector named Powell and associates. Thos. McFarlane discovered high grade silver ores in Ontario on an island in Lake Superior. (Silver Islet mine).
First recorded production of salt in Ontario, near Maitland river.
- 1866—Alfred Bernard Nobel discovered the method of making dynamite.
- 1869—Gold discovered in Fifteen Mile Stream district, Nova Scotia.
Gold discovered in Yukon river.
Salt produced at Seaforth, Ontario.
Transfer of Hudson's Bay Company Lands (Rupert's Land) to Dominion of Canada.
- 1870—First commercial shipments of apatite in Canada made from North Burgess twp., Ontario.
Montreal Mining Company sold Lake Superior mining lands, including Silver Islet.
- 1871—First recorded production of soapstone in Quebec from Bolton twp., Brome county.
Dominion Lands Survey Branch created.
Huronian mine (Moss) N.W. Ontario, located by Peter McKellar on advice of an Indian.
First staking of silver ores on Eureka Mt., near Hope, B.C.
- 1873—Dease Lake areas, B.C., staked for placer gold, first staker W. H. Smith.
Omineca placer mining area began to open up and Manson creek settlement established.
- 1877—Geological Survey of Canada recognized by Act of Parliament.
- 1878—Asbestos first mined in Quebec by Andrew Johnston (Johnston Asbestos Co.)
Gold discovered at Lake of the Woods, Ontario.
- 1879—Coal fields of the Crow's Nest Pass, B.C., opened.
- 1880—Geological Survey offices and museum moved from Montreal to Ottawa.
- 1881—Quebec Technical Mines Branch formed as division of Crown Lands Department.
Zenith zinc mine discovered, Nipigon district, Ontario.
- 1883—Copper-nickel ores discovered near Sudbury (Murray mine) by Thos. Flanagan.
Miners penetrated into the West Kootenay district, British Columbia, locating mines on Kootenay river and Kootenay lake.
- 1884—Worthington mine, Sudbury area, Ontario, discovered by F. C. Crean.
Silver Islet mine, Lake Superior, abandoned.
Kingdon lead mine deposits, Carleton county, Ontario, worked.
Thos. Froid and A. J. Cockburn discovered Froid mine, Sudbury area, Ontario.
Renaldo McConnell discovered copper-nickel ore in Snyder twp., Ontario.
- 1885—Samuel J. Ritchie organized Canadian Copper Company.
Copper Cliff mine, Ontario, discovered.
Henry Ranger located Creighton mine, Sudbury area, ore deposit first noted by Surveyor Salter and Geologist Murray.
- 1885—Canadian Pacific Railway completed.
John Chance staked Granite Creek placer deposits in British Columbia.
Cayoosh Creek placers staked in British Columbia.
James Stobie discovers Stobie mine, Sudbury area, Ontario.
- 1886—First shipments of coal from Lethbridge area, Alberta.

- 1886—First complete statistical returns issued by Geological Survey of Canada.
Incorporation of Canadian Copper Company.
First stakings in Boundary Creek area, British Columbia, by W. T. Smith.
First officially recorded Canadian mica production in Ontario and Quebec.
Stobie and Evans mines, Sudbury district, opened.
- 1887—R. W. MacArthur and Wm. Forest discovered cyanide process for gold extraction, at Glasgow, Scotland.
- 1888—Asbestos first milled in Quebec by Scottish Canadian Asbestos Co.
Coal discovered near Banff, Alberta.
Coal mining commenced at Canmore, Alberta.
First smelter blown in at Copper Cliff, Ont., December 24th.
Monarch mine on Canadian Pacific Railway at Field, B.C., opened.
Discovery of natural gas in Essex county, Ontario.
- 1889—Levack mine, Sudbury area, Ontario, discovered by James Stobie.
H. H. Vivian and Company of Swansea, Wales, started organized mining operations in Sudbury area.
Discovery of Leamington gas field in Ontario.
James Riley, Glasgow engineer, discovered the hardening and toughening effect of nickel in steel making.
Rossland Camp at head of Trail Creek, B.C., opened by staking of Lily May by Joe Bourjouis.
- 1890—Coal first mined in Turtle Mountain field, Manitoba. Vaden mine.
First smelter blown in at Murray mine, Sudbury. Matte shipped to Wales.
- 1891—First shipments from Rossland, B.C., to Colorado Smelting Works, Butte, Montana.
Sultana mine, Lake of Woods district, Ontario, opened, closed 1906.
The United States navy concluded successful experiments using nickel-steel for the first time as armour plate.
Bureau of Mines, Ontario, organized.
Garson Mine, Sudbury, discovered by John T. Cryderman.
- 1892—Col. R. M. Thompson developed the Orford nickel-copper separation process.
Dr. Ludwig Mond developed the Mond copper-nickel separation process.
Sullivan camp, B.C., commenced by staking of the Hamlet, etc., claims by Pat Sullivan, John Cleaver, E. C. Smith and W. C. Burchett.
- 1893—Kneehills coal mines, Alberta, opened.
Mikado mine, Lake of Woods district, Ontario, discovered.
- 1894—Pilot Bay smelter constructed and silver-lead-zinc mines of Ainsworth and Slocan, B.C., became active.
- 1895—Sullivan mine, B.C., commenced shipping.
- 1896—Salt produced in Dauphin Lake district, Manitoba; sold to settlers.
Iron ore bounties inaugurated.
Black Donald graphite mine, Renfrew county, Ontario, discovered and operated in 1897.
Discovery of placer gold in Klondike, Yukon Territory.
Hall mines smelter at Nelson, B.C., opened.
Iron Mask staked August 13 at Kamloops, B.C., by Geo. Breedson.
B.C. Smelting and Refining Company started smelting Rossland ores at Trail in February—Promoters: D. C. Corbin and August Heinze.
- 1897—Pioneer mine, B.C., located September 6, by Wm. Allen.
- 1898—Atlin goldfields, B.C., discovered by prospectors turning aside from the Klondike gold rush; Rainy Hollow copper deposits discovered in same manner.
- 1898—Pioneer and other claims staked on Cadwallader Creek, B.C.
Britannia mine deposits, B.C., discovered by Oliver Furry.
- 1899—Helen iron mine, Ontario, opened by Algoma Steel Corporation.
Frood mine, Sudbury, opened.
Sunset claim, Copper Mountain, B.C., staked.
Granby Consolidated Mining, Smelting and Power Co., B.C., incorporated.
- 1900—Mond Nickel Company incorporated.
Corundum mining commenced in Renfrew county, Ontario.
Klondike gold production reaches maximum.
Nova Scotia Steel and Coal Co. acquire Sydney coal mines of General Mining Association.
April 1st, Grand Forks smelter started in B.C.
Bonanza mine, Observatory Inlet, B.C., discovered by Donahue and H. C. Flewin.
Granby smelter, at Greenwood Camp, B.C., blown in on August 21.
Tale mining started in Hastings county, Ontario.
- 1901—First wells drilled for natural gas in Medicine Hat field, Alberta.
Creighton mine, Sudbury area, commenced production.
Crofton smelter, B.C., started.
Britannia mine, B.C., started shipping concentrates to Tacoma.
Production of aluminium, Shawinigan Falls, Quebec.
Hidden Creek mine, Observatory Inlet, B.C., discovered by McMillan, Rudge and H. C. Flewin.
Boundary Falls smelter, B.C., started.

- 1901—Tyee smelter, B.C., started.
First active development of gypsum deposits in Manitoba, the Manitoba Union Mining Company erecting a crushing and calcining mill on Portage Bay.
- 1902—Incorporation of International Nickel Company of New Jersey.
Marysville smelter, B.C., constructed.
Electrolytic lead (Betts process) made at Trail, B.C.
- 1903—High grade silver-cobalt minerals discovered at Long Lake, later known as the Cobalt Camp, Temiskaming district, Ontario.
St. Anthony mine, Sturgeon Lake, commenced producing.
Settlement of Alaska Boundary dispute.
Mining commenced at Hedley, B.C.
First recorded natural gas production in Alberta.
- 1904—Nipissing Mines incorporated.
La Rose Mine, Cobalt, started producing.
W. G. Trethewey located Trethewey mine, Cobalt, Ont.
Coniagas mine located, Cobalt, Ont.
Copper-gold ores discovered in Chibougamou district, Quebec.
- 1905—Atikokan iron mine, Ontario, equipped for production.
Buffalo mine, Cobalt, Ont., started operating.
First recorded shipment of Canadian fluorspar, Madoc, Ont.
Original test work on cyaniding cobalt ores in Canada carried out at School of Mining, Kingston, Ont. Mining commenced at O'Brien mine, Cobalt, Ont.
- 1906—January 18th. Consolidated Mining and Smelting Co. of Canada, incorporated.
Ontario Mining Act passed.
Discovery of gold by Ollier and Renault on Lake Fortune (Lake Fortune Mine), Quebec.
Silver discovered at Elk Lake, Ontario.
Gold discovered at Larder Lake, Ontario. Kerr-Addison, Chesterville, Dr. Reddick, Larder Lake Proprietary, Harris-Maxwell and many other properties staked.
First electrical mining equipment used in Canada installed at Creighton mine, Sudbury district, Ontario.
- 1907—Silver discoveries at Gowganda, Ont.
Silver discovered in South Lorraine, Ont.
Supplementary Revenue Act imposes tax on mining profits in Ontario.
Federal Department of Mines created under a Minister of Mines.
Silver and arsenic produced at Deloro, Ont., from silver-cobalt-nickel-arsenic ores of the Cobalt District of Ontario.
- 1908—First gold discovery in Porcupine area, Ontario, by H. F. Hunter.
Gold mills operated in Larder Lake District at Harris-Maxwell, Larder Lake Proprietary and Dr. Reddick properties; district was later dormant for several years.
First silver production from South Lorraine, Ont.
Branch of Royal Mint established at Ottawa, Ont.
First shipments of magnesite from deposits in Grenville twp., Quebec.
- 1909—Hollinger mine gold veins discovered by Benjamin Hollinger, John Miller and Alex. Gillies.
McIntyre mine veins, Porcupine, Ont., discovered by Alex. McIntyre.
Dome mine deposits, Porcupine, Ont., discovered by John Wilson and associates.
Cyaniding of low grade ores commenced at O'Brien mine, Cobalt, Ont.
- 1910—Premier mine, B.C., discovered by Bunting Bros. and Wm. Dilsworth.
Mixed nickel and cobalt oxides produced at Deloro, Ont.
- 1911—First gold discovery in vicinity of Kirkland Lake, Ont., made by W. H. Wright on what is now known as the Wright-Hargreaves mine.
Porcupine camp destroyed by fire with heavy loss of life.
Discovery of gold by J. J. Sullivan and H. Authier in Dubuison twp., Quebec.
First recorded discovery of gold in Manitoba by Major E. A. Pelletier at Rice Lake.
First shipment of British Columbia gypsum used in cement manufacture.
Victoria Memorial Museum, Ottawa, completed.
Black Cobalt Oxide and Grey Cobalt Oxide first marketed from Deloro, Ont.
- 1912—Hollinger mine, Porcupine, commenced first milling operations.
Low grade cyanide process installed at Nipissing mine, Cobalt.
Copper Mountain claims, B.C., taken over by British Columbia Copper Co.
Natural gas production commenced in Stony Creek field, New Brunswick.
Harry Oakes staked ground later known as Lake Shore Mine at Kirkland Lake, Ont.
- 1913—Tough-Oakes mine, Kirkland Lake camp, Ontario, shipped high grade cobbled ore.
Gold discovered on Kirkland Lake properties known later as Lake Shore, Teck-Hughes, Kirkland Lake and Sylvanite mines.
Smelting of nickel ores commenced by Mond Nickel Co. at Garson, Ont., May 15.
Incorporation of British American Nickel Co., Ltd.
- 1914—Supplementary Revenue Act in Ontario changed to The Mining Tax Act.
Doctor T. O. Bosworth staked petroleum claims at Fort Norman, N.W.T.
Granby copper smelter, at Anyox, B.C., blown in.
Cyanidation first used in Kirkland Lake camp, at Tough-Oakes mine.
- 1915—Siscoe mine claims staked in Quebec by S. E. Siscoe.

- 1915—Flin Flon ore deposits discovered by Thos. Creighton representing the Hammell-Currie-Fasken syndicate.
Mandy mine, Manitoba, discovered.
- 1916—Construction commenced on nickel refinery at Port Colborne, Ont.
Incorporation of International Nickel Co. of Canada.
Falconbridge Nickel deposits, Sudbury district, Ontario, later known as Falconbridge Nickel Mines, discovered by drilling.
Pioneer mine, B.C., commenced drilling operations.
Electrolytic refined copper and zinc first produced at Trail, B.C.
- 1917—Teck Hughes mine, Kirkland Lake, started milling.
Mandy mine, Man., produces.
- 1918—Tough-Oakes mine temporarily closed.
Refined nickel produced in Canada at Port Colborne plant of International Nickel Co.
Premier mine, B.C., came into production.
- 1919—Lake Shore, Wright-Hargreaves, and Kirkland Lake mills commenced operations.
Ontario Department of Mines formed.
Smelter of British American Nickel Co. at Nickelton, Ont., and refinery at Deschenes, Que., commenced operations.
L. Beauvet discovered silver-lead ores at Keno Hill, Mayo district, Yukon.
First salt shipments from Malagash deposits in Nova Scotia.
- 1920—Rock salt discovered at Fort McMurray, Alberta.
The first well, Discovery No. I, drilled at Fort Norman, N.W.T., by the Imperial Oil Company Ltd., petroleum found at 783 feet.
Mandy mine, Manitoba, suspends operations.
- 1921—Noranda ore deposits, Quebec, staked by Ed. Horne.
First shipment of silver-lead ores from Mayo, Yukon.
Rubber mill liners used at Nipissing mill, Cobalt, Ont.
- 1922—Amulet mine claims, Quebec, staked by McDonough Bros.
Rod mills appeared as milling equipment in Canadian mining plants.
Drilling commenced in Wainwright oil field.
- 1923—Granada mine claims, Rouyn, Quebec, staked by R. C. Gamble et al.
Sherritt-Gordon ore deposit staked by Carl Sherritt and Phillip Sherlett in January.
Red Coulee well first to reach oil in Sunburst formation, southern Alberta.
- 1924—British American Nickel Co. went into liquidation.
Royalite No. 4 well, Turner Valley, Alberta, brought into production.
Lithium ore discovered near Pointe du Bois, Manitoba.
- 1925—Discovery of gold in Red Lake district by Lorne Howey on what was later known as the Howey mine.
Silver-lead ores milled at Wernecke, Yukon.
Waite-Ackerman-Montgomery mine claims staked by H. Montgomery.
Allenby Copper Company took over Copper Mountain claims in August and shipped concentrates to Trail, B.C.
- 1926—Aluminium first produced at Arvida, P.Q., by Aluminum Company of Canada.
Falconbridge Nickel Mines incorporated.
- 1927—Noranda mine commenced shipping; smelter operated for first time.
Central Manitoba mine operated mill for first time.
Sherritt-Gordon mines incorporated in Ontario, July 5.
- 1928—Collapse of Worthington mine.
Waite-Ackerman-Montgomery mine started shipping.
Merger of Mond and International Nickel Companies.
Coniaurum mill, Porcupine camp, Ontario, commenced production in July.
March mine, Porcupine camp, Ontario, came into production.
Disastrous underground fire, in February, at Hollinger mine, Porcupine camp, Ontario, 39 lives lost.
Argonaut and Associated Goldfields suspended gold mining operations in Ontario.
Tough-Oakes-Burnside mine closed November 28.
- 1929—Canada's mineral production reached a record value of \$310,850,246.
Red Coulee field, Alberta, began petroleum production.
Siscoe gold mine, Quebec, started production.
New 300 ton mill of Monarch mine, B.C., started producing.
Dome mine mill, Porcupine camp, Ontario, destroyed in October by fire.
New surface plant at Froid mine, Sudbury, Ont., placed in operation.
Natural resources transferred to Manitoba and Alberta.
McIntyre mine, Porcupine, Ontario, erected small flotation plant.
- 1930—Gold discovered in Bannockburn township, Ontario, on what was later known as the Ashley mine.
Mill installed on Minto mine, Michipicoten, Ont.
New mill at Howey mine, Red Lake, Ont., commenced operations April 2.
Silver-radium ores discovered by G. Labine at Great Bear Lake, N.W.T.
Granada mine, Quebec, commenced production.
Manitoba, Saskatchewan and Alberta took over natural resources from Federal Government.

- 1930—Island Falls power plant, Manitoba, operated for first time, June 1.
 First refined zinc produced in November at Flin Flon, Manitoba, by Hudson Bay Mining and Smelting Co.
 First blister copper produced at Flin Flon, Manitoba, in December.
 New smelter of International Nickel Co. blown in at Copper Cliff, July 1.
 New electrolytic copper refinery of Ontario Refining Co. placed in operation at Copper Cliff, Ont.
 New Falconbridge Nickel Mines smelter blown in February 4, Sudbury, Ont.
 Bismuth first produced at Trail, B.C.
 Fuming plant constructed at Trail, B.C., for recovery of lead and zinc.
 Natural resources transferred to British Columbia and Saskatchewan.
 Copper Mountain Mine, B.C., closed down November 15.
 Canada attained position of the world's second greatest gold producer.
 Nitre cake and sulphuric acid produced regularly in new plant of Canadian Industries Limited at Copper Cliff, Ont.
 First discovery well drilled in Red Coulee Field, Alberta
- 1931—Toburn (Tough-Oakes) mine, Kirkland Lake, re-opened.
 Lake Shore mine, Kirkland Lake, Ont., installs 200 ton flotation unit in mill.
 Gold discoveries made in Swayze and Three Duck Lake areas, Ontario.
 Parkhill and Minto mines in Michipicoten district, Ontario, came into production.
 Gold discovered at Island Lake, Manitoba.
 Commercial production of fertilizer commenced at Trail, and smoke claims against Consolidated Mining and Smelting Company settled.
 Nipissing Mining Company, Cobalt, Ont., ceased mining silver-cobalt ores.
 Selenium produced for the first time in Canada by Ontario Refining Co. Ltd.
 Mining Corporation discontinued mining in South Lorraine, Ont.
 Keeley Silver mine, South Lorraine, Ont., closed.
 Canadian Copper Refiners Ltd., operated new copper refinery at Montreal East, Quebec.
 Regular production commenced by Sherritt-Gordon mill, Manitoba, April 1st.
 Equalization exchange premiums paid by Dominion Government to gold miners.
 Exports of gold bullion without licence prohibited by Dominion Government.
 Great Britain went off the gold standard on September 21, and was followed by many other countries.
 Big Missouri Mine, B.C., operated pilot mill.
 Nickel Plate mine, Hedley, B.C., closed down.
 Orford process plant completed at Copper Cliff, Ont.
 Copper converters at Port Colborne, Ont., closed down in August, preparatory to transferring Orford process to Copper Cliff.
 New Brunswick Power Commission plant came into operation in September, using Minto coal.
 Test shipments of Ontario lignite from Onakawana deposits, made to Germany.
- 1932—Ashley mine, Ontario, commenced gold production in October.
 Nickel output in Ontario greatly reduced.
 Kenty mine in Swayze area, Ontario, sank two shafts.
 O'Brien Cadillac mine, Quebec, commenced gold milling.
 Sherritt-Gordon, Manitoba, suspended mining operations in June.
 San Antonio gold mine, Manitoba, commenced production in May.
 Beattie gold mines, Quebec, commenced construction of mill.
 Treadwell Yukon Mining Co. commenced production of gold in new mill on Bussière claims in Quebec.
 The United States imposed duty of 4 cents per pound, in June, on foreign copper.
 McLeod River Mining Corporation operated gold dredge near Peers, Alberta.
 Salt produced commercially for first time at Neepawa, Manitoba.
 First commercial shipment of silver-radium ores from Great Bear Lake, N.W.T., silver ores being smelted at Trail, B.C.
 Silver reached a record low of 24.5 cents in New York, December 29.
 Eldorado Gold Mines commenced treatment of radium-bearing ores in new plant at Port Hope, Ont.
 Domestic Fuel Act expired June 20.
 Moss mine, Thunder Bay district, Ontario, commenced gold production.
 Mill at Braylorne mine, British Columbia, placed in operation.
 Gold discovered at God's Lake, Manitoba.
 Domestic copper sold in the United States, December 6, at 5 cents per pound, Connecticut an all time low for the metal.
 First officially recorded statistics of metal production for Saskatchewan.
 Treadwell Yukon mill at Wernecke, Yukon, permanently shut down and camp abandoned.
 Union of South Africa abandoned gold standard, December 28, 1932.
 Small oil refinery operated at Fort Norman, N.W.T.
 Gem Lake and Cryderman mines, Manitoba, commenced milling.
- 1933—United States ratified the silver agreement of the London Economic Conference December 22.

- 1933—Amalgamation of Toronto and Standard Mining Stock Exchanges agreed upon.
 Salt produced at Simpson, Sask.
 Macassa mine, Kirkland Lake, Ontario, commenced milling.
 United States went off gold standard April 19.
 Cariboo Gold Quartz Mining Co. commenced production near Barkerville, British Columbia.
 First absorption plant put into operation in Alberta to extract liquids from Turner Valley gas.
 Milling commenced at Island Lake mine, Manitoba.
 Milling commenced at San Antonio mine, Manitoba.
 Monarch mine, Field, British Columbia, resumed production.
 Beattie Gold Mines, Quebec, commenced production of concentrates.
 Port Hope radium refinery in Ontario came into production; radium and uranium compounds produced commercially in Canada for the first time.
 Green-Stabell Gold Mine, Quebec, commenced milling.
 Oro Grande mine, Manitoba, commenced milling.
 Reno mine, British Columbia, resumed production after destruction of mill by fire.
 Seal Harbour Gold Mines Ltd. commenced operations in Nova Scotia.
 Montague Gold Mines Ltd. commenced work in Montague district, Nova Scotia.
 Gem Lake mines, Manitoba, taken over by Diana Gold Mines Ltd.
- 1934—Perron gold mine commenced milling in July—northwest Quebec.
 A well, Century 1, completed in Turner Valley, Alberta, produced crude oil instead of naphtha-laden gas.
 Fifty ton amalgamation mill came into production at McWatters mine, northwest Quebec.
 Milling commenced at Sullivan mine, northwest Quebec, in May.
 Milling commenced at Little Long Lac mine, Ontario, November 24.
 Milling commenced at J. M. Consolidated mine, Patricia district, Ontario, in May.
 Milling commenced at Northern Empire mine, Ontario, March 13.
 Milling commenced at Matachewan Consolidated Mine, Matachewan district, Ontario.
 Milling commenced at Young-Davidson mine, Matachewan district, Ontario, on September 8.
 Milling commenced at Central Patricia mine, Patricia district, Ontario, on May 27.
 Tetreault mine, Portneuf county, Quebec, resumed production in November.
 First actual production of selenium in Quebec; recovered by Canadian Copper Refiners Ltd. from anode copper from Noranda smelter.
 Lloydminster No. 1 first commercial gas well in Saskatchewan came in at 1,975 feet, Lloydminster, March 30.
 Lloydminster first town in Saskatchewan to use natural gas.
 Discovery of gold south of Beaverlodge Lake, Saskatchewan, by C. Nyman or Tom Box.
 January 31, the President of the United States issued a Proclamation reducing the gold weight of the United States dollar from 25·8 to 15 5/21 grains, 0·9 fine.
 Dominion Tax on gold came into effect April 19.
 Bralorne mill, British Columbia, capacity increased and late in year milling was commenced at the Dentonia, Island Mountain and Kootenay Belle properties.
 Operations at Oro Grande mine, Manitoba, taken over by Beresford Lake Mines Ltd.
 Production suspended.
 Guysboro Mines Ltd., Goldenville, Nova Scotia, commenced operations in July.
 Rock wool industry established in Canada.
 Operations resumed at Rex mine, Manitoba.
 Operations resumed at Gem mine, Manitoba, by Diana Gold Mines Ltd.
- 1935—Monarch mine, Field, British Columbia, suspended milling on December 5.
 Treadwell Yukon Company Limited installed a new mill at Elsa mine, Mayo district, Yukon.
 Chromite ore smelted by Chromium Mining & Smelting Corporation Limited at Sault Ste. Marie, Ontario.
 Operations suspended at Canusa mine, Porcupine district, in September.
 Dominion Government transferred gold held against Dominion notes to Bank of Canada.
 Milling commenced at Pickle Crow mine, Patricia district, Ontario, on May 1.
 Milling commenced at Ross mine, Hislop township, Ontario, on January 1.
 Milling commenced at McKenzie Red Lake mine in February.
 Bank of Canada commenced operations on March 11.
 Silver held by Dominion Government transferred to Bank of Canada.
 United States Government's buying price of domestic silver raised to 77·57 cents in April.
 Gold bullion tax discontinued after May 31 and depletion allowances revised for payments of gold mining dividends.
 British Metals Corporation resumed operations in October at Sterling mine in Nova Scotia.
 In northwest Quebec, the Arntfield, Canadian Malartic and Lamaque gold mines came into production.
 Gold-bearing veins discovered in Sachigo River area, Patricia district, Ontario.
 In British Columbia, new mills came into production at Ymir Yankee Girl, Second Relief and Sheep Creek gold mines.

- 1935—First actual production of tellurium in Quebec; recovered from anode copper from Noranda smelter.
 Milling commenced at God's Lake mine, Manitoba, in September.
 Milling suspended at Island Lake mine, Manitoba.
 Colony gas wells Nos. 1, 2 and 3 came in at Lloydminster, Saskatchewan.
 Rt. Hon. Sir Montague Barlow, Bt., appointed September 13 by Alberta Government to report on Alberta coal mining industry.
 Bralorne and Bradian mines consolidated in British Columbia.
 The Granby Consolidated Mining, Smelting and Power Company closed down its Anyox operations in August and the company went into voluntary liquidation.
 Explosion at Lethbridge Collieries, Alberta, December 9—16 men killed.
 Milling of ore from the Nickel Plate mine, British Columbia, (Kelowna Exploration Co.) was resumed after some years of inactivity and the capacities of Cariboo Gold Quartz and Island Mountain mills were increased.
 Granda Gold Mines, western Quebec, suspended production.
 Discovery of natural gas at Kakwa, Saskatchewan.
 Consolidated Mining & Smelting Company of Canada Ltd. commenced gold mining operations at Caribou, Nova Scotia, in August.
- 1936—Imperial coal mine, Coalhurst, Alberta, abandoned.
 Pembina Peerless Colliery, Evansburg, Alberta, closed.
 Shawkey mine, northwest Quebec, brought into production in February.
 First cyanide gold mill erected in Nova Scotia, at Seal Harbour mine.
 Perron Mines, northwest Quebec, brought new 125 ton mill into production in February.
 Stadacona-Rouyn mine, northwest Quebec, brought into production in November.
 Mining claims staked in Quebec reached an all-time high record of 17,503.
 Ashley mine, Ontario, closed down in July.
 Pamour mine, Porcupine district, Ontario, went into production in May.
 Ardeen mine, Moss township, Ontario, closed down in December.
 Red Lake Gold Shore mine came into production in August.
 Argosy mine, Ontario, opened 125 ton mill in July.
 Extensions made to both International and Falconbridge Nickel Companies' plants.
 Gunnar gold mine, Manitoba, commenced production in May.
 Rex mine (Laguna) Herb Lake, Manitoba, resumed production in August.
 Clean-up operations conducted and final shipments made at Anyox copper mine, British Columbia.
 Copper Cliff smelter enlarged by two furnaces and seven converters.
 Ore dressing plant, mill and smelter at Falconbridge Nickel Mines enlarged.
 Turner Valley Royalties No. 1 brought in as the first big crude oil producer in Turner Valley field.
 Cadmium metal produced for first time by Hudson Bay Mining & Smelting Company at Flin Flon.
 Amendment to Income Tax Act in May exempted new producing metal mines for 3 years.
 Thompson Cadillac mine, western Quebec, commenced milling in June.
 Belletierre mine, western Quebec, commenced milling in October.
 Road from Amos to Val d'Or, Quebec, completed.
 Milling capacity increased to 325 tons a day at San Antonio mine, Manitoba.
 Adolph Studer discovered gold in September at Sulphide Lake, Saskatchewan.
 25 ton gold mill erected on Monarch claim, Amisk Lake, Saskatchewan.
 In British Columbia production was resumed at the Surf Inlet mine. New mills began operating in British Columbia at the Bayonne, Hedley Mascot and Wesko mines and the flotation mill at Kootenay Belle was replaced by a cyanide mill of greater capacity.
 The Dentonia flotation mill, British Columbia, ceased operating.
 Production of elemental sulphur and other products from lean roaster gases was commenced on a commercial scale at the Trail smelter.
 Important gold discovery at O'Brien mine, Cadillac township, western Quebec.
 Cave-in at Moose River gold mine, Nova Scotia—April.
- 1937—Milling commenced in July at Delnite, mine, Porcupine district, Ontario.
 Milling commenced at Raven River mill, Larder Lake district, Ontario.
 Sand River mine, Thunder Bay district, Ontario, came into production.
 Gurney gold mine, Manitoba, came into production in October.
 Production resumed at Sherritt-Gordon mine, Manitoba, on August 1.
 Production resumed at Copper Mountain mine, Allenby, British Columbia, in June.
 Bousquet and McMillan mines, Sudbury district, closed.
 New Golden Rose cyanide mill, Temagami district, Ontario, completed.
 Tashota mine, Ontario, closed down in October.
 Gold Eagle mine, Patricia district, completed mill in October.
 Hudson Patricia mine, Patricia district, closed.
 Milling commenced at Bankfield mine, Ontario, in June.
 Aldermac mine, western Quebec, resumed production in January.
 Sigma mine, western Quebec, commenced milling in March.
 Powell Rouyn mine, western Quebec, went into production, first shipment in June.

- 1937—Waite-Amulet mines, western Quebec, resumed production in June.
 Cournor mine, western Quebec, resumed production.
 Normetal mine, western Quebec, went into production in September.
 Tetreault mine, Portneuf county, Quebec, closed.
 Mining claims staked in Quebec reached an all-time high record of 18,841.
 Goldfield, Saskatchewan, officially created a village in September.
 Western Gem coal mine, Drumheller, Alberta, abandoned.
 Regular mining and milling operations suspended at Central Manitoba mines, July 8.
 First commercial shipment of lithium minerals in Canada made from Pointe du Bois district, Manitoba.
 Gold Clauses Act passed (obligation to pay in gold not required).
 Nova Scotia Government reopened Lacey mine as a training project.
 Colliery No. 20 opened at New Aberdeen, Nova Scotia, by Dominion Coal Co.
 New gold mills commenced operating at Polaris Taku (November), and Durango mines, British Columbia.
 The Quebec legislature passed a law enacting that a company must be constituted by a Quebec charter to acquire mining rights belonging to the Crown.
 Beresford Lake Mines Ltd., Manitoba, resumed production in December.
 Natural gas discovered at Kamsack, Saskatchewan.
- 1938—Mesabi mine, Kirkland Lake district, came into production in May.
 Gas explosion at Hinton Collieries, Hinton, Alberta, March 30.
 A vocational mine school was organized by Quebec Bureau of Mines at Gale mine.
 A substantial deposit of copper-zinc ore discovered at Amulet mine, Quebec.
 Rouyn-Louvincourt road completed in western Quebec.
 Tionaga mine, Sudbury district, Ontario, came into production.
 Parkhill and Algold mines, Algoma district, Ontario, closed down.
 Morris Kirkland mine ceased operations in July.
 Madsen Red Lake mine came into production in August.
 Sachigo River mine, Patricia district, Ontario, started milling in May.
 Consolidated-Rycon mill came into production in September—Yellowknife, Northwest Territories.
 Hasaga mines, Red Lake, Ontario, took over Red Lake Gold Shores mill.
 Privateer and Spud Valley mines, Zeballos district, British Columbia, commenced milling in the latter part of the year.
 Gold Belt mine in the Sheep Creek camp, British Columbia, commenced milling.
 Milling ceased at the Durango and Wesko properties, B.C.
 Queens Mines Ltd. commenced operations during January in Molega district, Nova Scotia.
 British Metals Corp. (Canada) Ltd. closed down mining operations at Stirling, Nova Scotia in February.
 Moneta mine, Porcupine district, brought into production in January.
 Big Missouri mill in Portland Canal area, British Columbia, came into production in May.
 Development of Box mine near Goldfields, Saskatchewan.
 Cariboo Hudson mine, British Columbia, commenced producing.
 New mines commencing production in Quebec were the East Malartic, Francoeur, Halliwell, Lapa Cadillac, Lake Rose, Pan Canadian, Payore and Sladen-Malartic.
 C.N.R. Bonnetterre-Rouyn line completed in northwest Quebec.
 Commercial production of mercury at Mud Creek, British Columbia.
 Hallnor mine, Porcupine district, Ontario, brought into production in June.
 Milling commenced in June at Golden Gate mine, Kirkland Lake district, Ontario.
 Upper Canada mine, Kirkland Lake district, Ontario, came into production.
 Kerr-Addison mine, Larder Lake, commenced milling on May 2.
 Cline mine, Algoma district, Ontario, commenced milling in July.
 McLeod-Cockshutt and Hardrock mines in Thunder Bay district, Ontario, started milling and Magnet mine shipped ore.
 Gold discovered at Thompson, Wray and Russell Lakes, Northwest Territories.
 Straw Lake Beach mine, Kenora district, Ontario, started milling.
 Lapa Cadillac mine, western Quebec, commenced milling in August.
 East Malartic mine, western Quebec, commenced milling in November.
 Tombill mine, Thunder Bay district, came into production in February.
 Discovery of bessemer grade hematite ore at Steep Rock Lake, Atikokan, Ontario, reported in March.
 Tungsten mine opened at Goff, Nova Scotia.
 Colliery No. 18 opened at New Waterford, Nova Scotia, by Dominion Coal Co.
 Sladen Malartic mine, western Quebec, commenced milling in January.
 Pan Canadian mine, western Quebec, went into production in May.
 Payore mine, western Quebec, commenced milling in June.
 Lake Rose mine, western Quebec, commenced milling in June.
 Francoeur mine, western Quebec, went into production in August.
 A Superior School of Mines, Geology and Metallurgy established in Quebec city.
 Canadian Kaolin Silica Products Ltd. remodelled and enlarged its silica plant at St. Remi, Papineau county, Quebec; daily capacity increased to 500 tons.

- 1938—Belletierre Quebec Mines Ltd. completed the erection of a hydro-electric power plant on Winneway River, Guillet township.
Oil found in wells at Lloydminster and Vara, Saskatchewan.
- 1939—New Gold Clauses Act passed.
Negus mine, Yellowknife, Northwest Territories, came into production in February.
Eustis mine, Quebec, closed permanently.
Export of copper, lead, zinc and various other metals and minerals prohibited without licence.
New Helen iron mine, Michipicoten district, Ontario, resumed production.
King George and Queen Elizabeth visit Frood mine, Sudbury, Ontario, June 5.
September 1, German army invades Poland.
September 3, Germany and Great Britain at war.
September 10, Canada declared war against Germany.
Income Tax amendment afforded tax credit to mining industry as a whole.
Amm gold mine, western Quebec, went into production in March.
Mooshla mine, western Quebec, went into production in August.
Malartic Gold Fields mine, western Quebec, commenced milling in December.
Chesterville mine, Larder Lake, Ontario, came into production in June.
Tyrantite mine, Matachewan district, Ontario, came into production in June.
Ronda mine, Sudbury district, Ontario, produced from January to August.
Preston East Dome mine, Porcupine district, Ontario, came into production in March.
Magnet Consolidated Gold Mine, Thunder Bay district, Ontario, commenced milling in July.
Uchi mine, Patricia district, Ontario, commenced milling in May.
Cochenour Willans, Patricia district, Ontario, came into production in March.
Kenricia mine, Kenora district, Ontario, started milling in July.
Agwa mine, Ontario, began milling in July, closed down September 30.
Nova Scotia Government opened a rehabilitation project in the fifteen mile stream district.
Guysborough Mines Limited open new mine at Lake Charlotte, Nova Scotia.
Tungsten mine at Indian Path, Nova Scotia, reopened by Siscoe Gold Mines Ltd.
Wood Cadillac mine, western Quebec, commenced milling in December.
Bay View Colliery No. 8 opened at Joggins, Nova Scotia, by Joggins Coal Co. Ltd.
Central Cadillac mine, western Quebec, commenced milling operations in November, using Thompson-Cadillac mill.
Quebec Government established an ore sampling plant at mine school.
Waite-Amulet Mines Ltd. built a new mill at Amulet mine.
Canadian Refractories Limited started development of large brucite deposits in Gatineau district of Quebec.
De Santis mine, Porcupine district, Ontario, commenced milling in July.
Broulain mine, Porcupine district, Ontario, commenced milling in November, using Mace mill.
Porcupine Lake mine closed down in April.
Mace mine, Porcupine district, Ontario, closed down in November.
New 150 ton mill of Upper Canada Mines, Kirkland Lake district, started.
Raven River mine ceased milling, Larder Lake, Ontario, in July.
Kerr-Addison mine, Larder Lake, Ontario, increased mill to 900 tons.
Tionaga mine, Sudbury district, Ontario, closed down in May.
Lebel Oro mine, Sudbury district, Ontario, closed down in October.
Algoma Summit mine, reopened under name of Magino.
Minto mine, Algoma district, Ontario, closed down July 31.
Ransom mine, Algoma district, started in July.
Hiawatha mine, Algoma district, Ontario, suspended operations in July.
Jellicoe mine, Thunder Bay district, Ontario, commenced ore shipments to Magnet mill in August.
Berens River mill, Patricia district, Ontario, started September 8.
Elora mill, Kenora district, Ontario, closed down in September.
Cordova mine, Hastings county, Ontario, resumed production in December.
Laguna (Rex) mine, Manitoba, suspends operations in December.
Gurney mine, Manitoba, suspends operations in November.
Flin Flon mine increases output to 5,200 tons a day.
Box mine mill, Goldfields, Saskatchewan, commenced operating in July.
Hillcrest Collieries, Alberta, abandoned.
Commercial production of tungsten concentrates at Wells, British Columbia, by Columbia Tungsten Co. Ltd.
Canadian War Supply Board commenced operations September 25.
Canadian Foreign Exchange Board formed September 15.
First Canadian troops landed in United Kingdom December 17.
Russia invaded Finland November 30.
Late in the year mills were completed at the Central Zeballos and Mont Zeballos properties in British Columbia.
Coalmont Collieries, British Columbia, ceased operations in April.

- 1939—Shipment of bentonite made from a deposit 7 miles northwest of Morden, Manitoba.
J. A. Coulombe reopened the Coulombe Titanic Iron Mine near St. Urbain, Charlevoix county, Quebec.
Montague Gold Mines Ltd. ceased operating during May in Nova Scotia.
Canadian base metals producers agree to supply the Imperial Government with copper, lead and zinc at prices prevailing shortly before the war.
- 1940—January 15, Canada's first publicly offered war loan placed on market.
January 20, details of British Commonwealth Air Training Plan announced.
February 25, first R.C.A.F. squadron landed in England.
April 9, Canadian Government announced the formation of the Department of Munitions and Supply.
May 10, Germany invaded Belgium, Holland and Luxemburg.
June 4, evacuation of B.E.F. from Dunquerque.
June 25, France ceased hostilities.
June 10, Italy declared war on Britain and France.
July 2, establishment of Wartime Industries Control Board at Ottawa.
In Quebec the Amm and Moosha Gold Mines ceased production and the Pandora and Senator-Rouyn mines produced bullion for the first time.
Cordova and Addington gold mines in eastern Ontario closed down.
Aunor Gold Mines Ltd., Porcupine camp, Ontario, in January shipped bullion for the first time.
Broulan Porcupine mines, Ontario, erected a new mill.
Faymar Porcupine mine, Ontario, commenced milling in April.
Hollinger Cons. Gold Mines Ltd. erected the first concrete headframe in Canada.
Jellicoe Mines Ltd., Ontario, ceased operations.
McMarmac Red Lake Gold Mines Ltd., Ontario, came into production in October.
J.-M. Consolidated Gold Mines Ltd., Ontario, ceased operations April 24.
Jason Mines Ltd., Ontario, resumed operations at the old Argosy mine in June.
Operations ceased at the Kenricia mine, Ontario, May 31.
Upper Seine Gold Mine, Ontario, resumed production.
Pamon Gold Mines Ltd. re-opened Monarch mine, Amisk Lake, Saskatchewan.
Hydro-electric plant completed by Consolidated Mining & Smelting Co. of Canada, Ltd., at Prosperous Lake, Northwest Territories.
Slave Lake Gold Mines Ltd. resumed operations in Northwest Territories in September.
Mercury gold mines, Northwest Territories, carried on exploration work.
Canadian Industrial Minerals Ltd. discovered important barite deposit in October at Pembroke, Hants county, Nova Scotia.
East deposit of Sherritt-Gordon Mines Ltd., Manitoba, came into production.
Milling re-commenced at Monarch mine, B.C. January 15.
Eldorado mine, Northwest Territories, temporarily closed June 18.
Consolidated Mining & Smelting Company of Canada, Ltd., commenced production in June of mercury at Pinchi Lake, British Columbia.
Canada banned exports of copper except to Great Britain.
Publication of statistics relating to Canadian production of strategic metals and minerals banned in December.
August 17-18, Ogdensburg conference.
September 9, second Canadian war loan offered.
Norwegian Nickel refinery of Falconbridge Nickel Mines Ltd. seized by Germans; company's matte now treated by International Nickel Company of Canada Limited.
Operation of Western Exploration Company mill at Silvertown, British Columbia, resumed in September.
Nicolet Asbestos Mines, Tingwick township, Quebec, resumed production in April.
The Quebec Legislature repealed the law passed in 1937 enacting that a company had to be incorporated under a law of the province to acquire mining rights on land forming part of public domain.
The Quyon Molybdenite Company Ltd. started production at the Moss mine, Onslow township, Quebec.
The Quebec Legislature passed the Unwrought Metal Sales Act to facilitate the suppression of illegal traffic in precious metals.
The Senneterre-Mont Laurier highway, Quebec, was opened to traffic.
Century mine, Elbow Lake, Manitoba, installed a century mill and produced some gold in July.
San Antonio mine, Manitoba, increased daily production to 550 tons in September.
Beresford Lake Mines Ltd., Manitoba, discontinued production in October.
50-ton sodium sulphate plant was erected at Sybouts Lake, Saskatchewan.
- 1941—August 14, "Atlantic Charter" declaration.
June 22, Germany attacked Russia.
August 29, Canada instituted sweeping controls of prices and sale of goods.
December 7, Japan attacked United States' possessions in the Pacific.
December 11, German and Italian declarations of war on United States, followed by similar action on the part of the United States.

- 1941—Canadian Wartime Mine Shop Association formed in May.
 Seal Harbour Gold Mines, Nova Scotia, closed down.
 Senator-Rouyn completed its new mill in April.
 Morris Kirkland Gold Mines, Ontario, closed down in December.
 Hoyle Gold Mines, Ltd., Ontario, commenced milling in January.
 Mic Mac Mines, western Quebec, commenced construction of a mill.
 West Malartic mines, western Quebec, commenced erection of a mill.
 The Quebec Government completed, in October, the erection of a hydro-electric power plant in Laudanet township, western Quebec.
 New plant using vacuum process erected by Neepawa Salt Co., Manitoba, for greatly increased salt production.
 Natural gas piped to Kamsack, Saskatchewan.
 Discovery of glass sands at Red Deer River, Saskatchewan.
 J. Purdy discovered an important deposit of muscovite mica on Lot 6, Concession 2 of Mattawan township, Nipissing district, Ontario.
 Canadian Industrial Minerals Ltd. commence milling barite at Pembroke, Nova Scotia, in May.
 First fluorspar mined in Nova Scotia at Lake Ainslie by North American Chemical Company.
 Bonetal Gold Mines Ltd., Ontario, shipped ore in November.
 New Golden Rose mine, Ontario, closed in September.
 500-ton mill at Jerome mine, Ontario, commenced operating in August.
 St. Anthony mine, Ontario, closed in December.
 Northern Empire Mines Ltd., Ontario, ceased operations.
 Operations ceased at the Upper Seine mine, Ontario.
 Operations at the Gold Eagle mine, Ontario, ceased September 12.
 Mining ceased at Howey mine, Ontario, November 3.
 Straw Lake Beach Mines ceased operations in July.
 The Howe Sound Exploration Co. explored its Snow Lake property, Manitoba.
 Preview Mines Ltd. operated a small gold mill at Sulphide Lake, Saskatchewan.
 Clean-up operations were conducted at the Windpass mine, British Columbia.
 Milling ceased at Relief Arlington mine, British Columbia, June 28.
 Milling commenced at Ptarmigan mine, Northwest Territories, November 27.
 Milling commenced at Thompson-Lundmark mine, Northwest Territories, August 19.
 Golden Manitou Mines Ltd., Quebec, commenced erection of a mill.
 Lake Geneva Mining Co. Ltd., Ontario, conducted mining and milling from August 1.
 Zintcon Mines Ltd., British Columbia, exported zinc concentrates.
 Aluminum Company of Canada Ltd. erected a plant at Wakefield, Quebec, for the production of brucite granules.
 Tin produced commercially for the first time in Canada; recovered at Trail, British Columbia, by the Consolidated Mining & Smelting Company of Canada, Ltd.
 Magnesium powder produced at Trail, British Columbia, by Consolidated Mining and Smelting Company of Canada, Ltd.
 Old Josephine iron mine, Algoma district, Ontario, being developed.
 Battle of Britain began June 7.
 Strike of miners at Kirkland Lake, commenced November 18.
 Lend-Lease Act passed by United States Congress, March 11.
 Reno Gold Mines mill, British Columbia, shut down late in the year.
 Refinery of Abasand Oils Ltd., commenced operating near Fort McMurray, Alberta; plant destroyed by fire in November.
- 1942—March 6, Prime Minister King announced approval of construction of Alaskan Highway.
 Wartime Metals Corporation formed in Canada.
 West Malartic, Mic Mac and Golden Manitou mines came into production in Quebec.
 Arntfield mine, Quebec, closed in April.
 Abasand Oils Ltd., rebuilt refinery at Fort McMurray, Alberta.
 Wood Cadillac mine, Quebec, closed in June.
 Pandora mine, Quebec, closed in August.
 Cournoir mine, Quebec, suspended operations at midyear.
 Operations suspended April 14 at Golden Gate and Crescent mines, Ontario.
 Mining operations suspended at the De Santis, Faymar, Nakhodas and Naybob properties, Porcupine district, Ontario.
 Hollinger Gold Mines, Ontario, completed a scheelite mill.
 Tyrant mine, Ontario, suspended operations July 31.
 Operations suspended at Rundle mine, Ontario, July.
 Renabie property, Ontario, closed in May.
 Cline Lake mine, Ontario, closed in November.
 Production at Bankfield mine, Ontario, ceased August 30.
 Operations ceased at Tombill and Elmos mines, Ontario, in November.
 Operations ceased at Sturgeon River mine, Ontario, in October.
 Sand River mine, Ontario, closed August 26.

1942—Goldorel mine plant, Ontario, destroyed by fire.

Jason mine, Ontario, closed down October 10.

Gunnar Gold Mine, Manitoba, closed in June.

Box mine, Saskatchewan, closed August 15.

Polaris-Taku mine, British Columbia, closed in April.

Big Missouri mine, British Columbia, ceased operations in October.

Surf Inlet, mine, British Columbia, ceased operations in November.

Bayonne mine, British Columbia, closed August 31.

Production of scheelite concentrates began early in the year at the Red Rose property, Hazelton, British Columbia.

Buccaneer mine, British Columbia, closed August 11.

Central Zeballos mine, British Columbia, closed July 7.

Homeward mine, British Columbia, closed February 7.

Musketeer mine, British Columbia, closed July 23.

Mount Zeballos mine, British Columbia, closed April 30.

Spud Valley mine, British Columbia, closed June 30.

Vancouver Island Drilling & Exploration Mine, British Columbia, closed October 15.

Ymir Yankee Girl mine, British Columbia, closed October 31.

New Calumet Mines carried on an extensive development program in Quebec.

Ptarmigan mine, Northwest Territories, closed in September.

Ruth mine, Northwest Territories, milled from August 1 to August 12.

International Tungsten Mines Ltd. (Slave Lake Gold Mines) operated only during first eight months of the year.

New copper deposit explored near Lennoxville, Quebec, by Aldermac Copper Corp. Ltd.

Miners' strike at Kirkland Lake ended February 11.

Coal miners in Cape Breton commence a week-long strike April 14.

Extension of National Selective Service March 24.

Indium produced in Canada for the first time at Trail, British Columbia.

Plant of Dominion Magnesium Ltd. near Renfrew, Ontario, came into production in September.

Important molybdenite deposits discovered by Dome Exploration Co. in Pressiac township, Quebec.

Kootenay Bell mine, British Columbia, ceased milling late in year.

The Tetreault mine, at Montauban-les-Mines, Portneuf county, Quebec, was re-opened by Siscoe Metals Ltd.; production started in August.

Wartime Metals Corporation re-opened the old molybdenite reduction plant in LaCorne township, Quebec.

Wartime Metals Corporation re-opened the Belanger chromite mine, in Coleraine township, Quebec, and commenced erection of a mill.

Chromite Limited, Cleveland township, Quebec, commenced production of chromite concentrate.

The Quebec Department of Mines erected a scheelite mill at the mine school near Val d'Or. For the first time the value of the annual mineral production of the province of Quebec reached the \$100,000,000 mark.

Extensive deposits of chromite discovered in June, in Bird River area, Manitoba.

Ogma mine, Manitoba, ships gold ore to Gunnar mill.

Manitoba permits employment of women for surface work at mines, July.

Successful operations carried out in the production of peat moss for agricultural purposes from Julius bog, Moss Spur, Manitoba.

250-ton sodium sulphate plant erected at Alsask Lake, June.

Port at Goldfields, Saskatchewan, closed December 31.

Pamon gold mine plant, Saskatchewan, destroyed by fire May 13.

Eldorado pitchblende mine, Northwest Territories, re-opened in April.

Sherritt-Gordon mine, Manitoba, produced zinc concentrates, June.

United States established a price of 71·11 cents an ounce for silver produced in the United States; foreign silver 45 cents per ounce.

Seal Harbour Gold Mines Ltd. ceased operations in Nova Scotia.

Guysboro Mines Ltd., Nova Scotia, suspended operations.

Canol project started early in summer near Fort Norman, N.W.T., through military necessity; 14 wells, showing petroleum, drilled during year.

1943—Mandy mine, Manitoba, re-opened by Emergency Metals Ltd., produced concentrate in April.

Naybob mine, Porcupine district, Ontario, closed in January.

Moneta mine, Porcupine district, Ontario, closed in August.

Hoyle mine mill, Porcupine district, Ontario, destroyed by fire in July.

Yama mine, Larder Lake, Ontario, closed in February.

Young-Davidson mine, Ontario, closed from January to May.

Wendigo mine, Ontario, permanently closed in January.

Regenery Metals mine, Ontario, closed in April.

Uchi mine, Ontario; mining operations discontinued in March.

1943—Magnet mine, Ontario, suspends operations in November.

Jerome mine, Ontario, suspends milling in August.

Gold rush into Missanabie, Ontario.

Goulais River magnetite deposits, Ontario, diamond drilled.

Privateer mill, British Columbia, closed in September.

Emerald and Red Rose tungsten mills in British Columbia shut down.

Elk River collieries, near Fernie, British Columbia, prepared for production.

Strike of coal miners in British Columbia and Alberta November 1 to November 13.

Indian Molybdenum Ltd. commenced production in September of molybdenite concentrates in Pressiac township, Quebec.

Dominion Steel & Coal Co. made shipments of iron ore from Bathurst, New Brunswick; closed late in year.

Development of Stobie and Murray nickel mines, Ontario, resumed; Old Alexo nickel mine, Ontario, re-opened by Harlin Nickel Mines Ltd.; ore shipped to International Nickel Company.

Ontario Nickel Corporation shipped nickel ore from Moose Lake, Sudbury district.

Bralorne Mines Ltd. produced mercury at Takla Lake, British Columbia.

Kenwest mine, Ontario, suspended operations in July.

Gold Belt mine, British Columbia, suspended operations in September.

Operations suspended at Con mine, Northwest Territories, September.

Operations suspended at Rycon mine, Northwest Territories, September.

Operations suspended at Thompson-Lundmark mine, Northwest Territories, October.

Reco Mountain Base Metals mines, British Columbia, shipped concentrates in November.

Twin "J" Mines Ltd., British Columbia, shipped concentrates in August.

Kootenay Florence mine, British Columbia, shipped concentrates in August.

New Calumet Mines Ltd., Quebec, came into production; zinc concentrates shipped in September.

Committee of inquiry into Ontario mining industry appointed by Premier Geo. Drew.

Nickel Offsets Ltd. made shipments of nickel ore from near Chelmsford, Sudbury area.

Asphalt produced from bituminous sands in Alberta by Oil Sands Ltd.

Stock piles of most Canadian-produced strategic metals and minerals reach satisfactory proportions.

Green Act raised United States Treasury price of silver to 71.11 cents per ounce.

Avon Gold Mines Ltd., Oldham, Nova Scotia, suspended operations in February.

Lava talc deposit developed in Kootenay National Park, British Columbia.

Italy surrendered Sept. 8th.

Molybdenite concentrates shipped from LaCorne mine, Quebec, a wartime project.

Table 7.—Annual Values of the Mineral Production of Canada since 1886

NOTE.—In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals, copper, gold, lead, nickel, silver, zinc, etc., is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued chiefly at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1886.....	10,221,255	2-23	1915.....	137,109,171	17-44
1887.....	10,321,331	2-23	1916.....	177,201,534	22-05
1888.....	12,518,894	2-67	1917.....	189,646,821	23-18
1889.....	14,013,113	2-96	1918.....	211,301,897	25-37
1890.....	16,763,353	3-50	1919.....	176,686,390	20-84
1891.....	18,976,616	3-92	1920.....	227,859,665	26-40
1892.....	16,623,415	3-39	1921.....	171,923,342	19-56
1893.....	20,035,082	4-04	1922.....	184,297,242	20-55
1894.....	19,931,158	3-98	1923.....	214,079,331	23-41
1895.....	20,505,917	4-05	1924.....	209,583,406	22-71
1896.....	22,474,256	4-38	1925.....	226,553,333	24-19
1897.....	28,485,023	5-49	1926.....	240,437,123	25-61
1898.....	38,412,431	7-32	1927.....	247,356,695	25-67
1899.....	49,234,005	9-27	1928.....	274,989,487	27-96
1900.....	64,420,877	12-04	1929.....	310,880,246	31-00
1901.....	65,797,911	12-16	1930.....	279,873,578	27-42
1902.....	63,231,836	11-36	1931.....	230,434,726	22-21
1903.....	61,740,513	10-83	1932.....	191,228,225	18-20
1904.....	60,082,771	10-27	1933.....	221,495,253	20-74
1905.....	69,078,999	11-49	1934.....	278,161,590	25-67
1906.....	79,286,697	12-81	1935.....	312,344,457	28-56
1907.....	86,865,202	13-75	1936.....	361,919,372	32-82
1908.....	85,557,101	13-16	1937.....	457,359,092	41-13
1909.....	91,831,441	13-70	1938.....	441,823,237	39-42
1910.....	106,823,623	14-93	1939.....	474,602,059	41-94
1911.....	103,220,994	14-32	1940.....	529,825,035	46-39
1912.....	135,048,296	18-33	1941.....	560,241,290	49-06
1913.....	145,634,812	19-35	1942.....	566,768,672	* 48-63
1914.....	128,863,075	16-75			
			Grand Total.....	9,751,982,266	* 836-79

* Based on an estimated population of 11,654,000 in 1942.

NOTE.—For complete data, by minerals, see Annual Mineral Production Reports for 1937 and 1938.

Table 8.—Annual Values of the Mineral Production of Canada, by Classes, since 1929

Year	Metallics	Non-Metallics		Total
		Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$
1929.....	154,454,056	97,861,356	58,534,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253
1934.....	194,110,968	64,763,861	19,286,761	278,161,590
1935.....	221,800,849	67,328,208	23,215,400	312,344,457
1936.....	259,425,194	76,723,437	25,770,741	361,919,372
1937.....	334,165,243	88,324,150	34,869,699	457,359,092
1938.....	323,075,154	84,869,417	33,878,666	441,823,237
1939.....	343,506,123	95,733,177	35,362,759	474,602,059
1940.....	382,503,012	104,849,372	42,472,651	529,825,035
1941.....	395,346,581	119,521,437	45,373,272	560,241,290
1942.....	* 392,192,452	128,846,413	45,729,807	566,768,672

* Exclusive of the value of pitchblende products.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals

Year	Gold*		Silver		Copper		Lead		Zinc†	
	fine oz.	\$	fine oz.	\$	pounds	\$	pounds	\$	pounds	\$
1858..	34,104	705,000								
1859..	78,129	1,615,072								
1860..	107,806	2,228,543								
1861..	128,973	2,666,118								
1862..	135,391	2,798,774								
1863..	202,498	4,186,011								
1864..	199,605	4,126,199								
1865..	192,898	3,987,562								
1866..	152,555	3,153,597								
1867..	145,775	3,013,431								
1868..	134,169	2,773,527								
1869..	102,720	2,123,405								
1870..	83,415	1,724,348								
1871..	105,187	2,174,412								
1872..	90,283	1,866,321								
1873..	74,346	1,536,871								
1874..	97,856	2,022,862								
1875..	130,300	2,693,533								
1876..	97,729	2,020,233								
1877..	94,304	1,949,444								
1878..	74,420	1,535,394								
1879..	76,547	1,582,358								
1880..	63,121	1,304,824								
1881..	63,524	1,313,153								
1882..	60,288	1,246,268								
1883..	53,853	1,113,246								
1884..	51,202	1,058,439								
1885..	55,575	1,148,829								
1886..	70,782	1,463,196			3,505,000	385,550				
1887..	57,460	1,187,804	355,083	347,271	3,260,424	366,798	204,800	9,216		
1888..	53,145	1,098,610	437,232	410,998	5,562,864	927,107	674,500	29,812		
1889..	62,653	1,295,159	383,318	358,785	6,809,752	936,341	165,100	6,488		
1890..	55,620	1,149,776	400,687	419,118	6,013,671	947,153	105,000	4,704		
1891..	45,018	930,614	414,523	409,549	5,929,401	1,226,703	88,665	3,857		
1892..	43,905	907,601	310,651	272,130	7,087,275	815,580	808,420	33,004		
1893..	47,243	976,603	330,128	330,128	8,109,856	871,809	5,703,222	187,636		
1894..	54,600	1,128,688	847,697	534,049	7,708,789	736,960	5,703,222	187,636		
1895..	100,798	2,083,674	1,578,275	1,030,299	7,771,639	836,228	16,461,794	531,716		
1896..	133,262	2,754,774	3,205,343	2,149,503	9,393,012	1,021,960	24,199,977	1,396,853		
1897..	291,557	6,027,016	5,558,446	3,323,395	13,900,802	1,501,960	39,018,219	1,208,399		
1898..	666,386	13,775,420	4,452,333	2,593,929	17,747,136	2,134,980	31,915,319	977,250		
1899..	1,028,529	21,261,584	3,411,044	2,032,658	15,078,475	2,655,319	21,862,436	2,760,521	788,000	36,011
1900..	1,350,057	27,908,153	4,468,225	2,740,362	18,937,138	3,065,922	63,169,821	2,760,521	814,000	46,805
1901..	1,167,216	24,128,503	5,599,192	3,265,854	37,827,019	6,096,581	51,900,958	2,249,387	212,800	9,342
1902..	1,032,161	21,336,067	4,291,317	2,238,351	37,827,019	4,511,383	22,956,381	934,095	142,200	6,883
1903..	911,559	18,843,590	3,198,581	1,709,642	42,684,454	5,640,487	18,139,283	768,562	900,000	45,600
1904..	796,374	16,462,517	3,577,522	2,047,095	43,383,722	5,306,635	37,531,244	1,617,221	477,568	24,350
1905..	684,951	14,159,195	6,000,023	3,621,133	48,092,753	7,497,660	56,864,915	2,676,632	9,413	139,200
1906..	556,415	11,802,120	8,473,379	5,659,455	55,609,888	10,720,474	54,608,217	3,089,187	1,154	23,800
1907..	405,517	8,382,780	12,779,799	8,648,659	56,979,205	11,398,120	47,738,703	2,542,086	1,573	49,100
1908..	476,112	9,842,105	22,106,233	11,686,239	63,702,873	8,413,876	43,195,733	1,814,221	452	3,215
1909..	453,865	9,382,230	27,529,473	14,178,504	52,493,863	6,814,754	45,857,424	1,692,139	18,371	242,699
1910..	463,707	10,248,835	32,869,264	17,580,455	55,692,369	7,094,094	32,987,508	1,216,249	5,063	120,003
1911..	473,159	9,731,077	32,559,047	17,355,272	55,648,011	6,886,998	23,784,966	827,717	2,590	101,072
1912..	611,885	12,643,794	31,955,560	19,440,165	77,832,127	12,713,548	35,763,476	1,597,554	6,415	211,774
1913..	802,973	16,598,923	31,845,803	19,040,924	76,976,925	11,753,600	37,662,703	1,754,705	7,889	186,827
1914..	773,175	15,983,007	28,449,821	15,593,631	75,735,960	10,301,606	36,337,765	1,627,568	10,893	262,563
1915..	918,056	18,977,901	26,625,960	13,228,842	100,785,150	17,410,635	46,316,450	2,593,721	14,895	554,938
1916..	930,492	19,234,976	25,459,741	16,717,121	117,150,028	31,867,150	41,497,615	3,532,692	23,364,760	2,991,623
1917..	738,831	15,272,992	22,221,274	18,091,895	109,227,332	29,687,980	32,576,281	3,628,020	29,668,764	2,040,817
1918..	699,681	14,463,689	21,383,979	20,693,704	118,769,434	29,250,536	51,398,002	4,754,315	35,083,175	2,862,436
1919..	766,764	15,850,423	16,020,667	17,802,474	75,053,581	14,028,265	43,827,699	3,053,037	62,194,707	2,362,448
1920..	765,007	15,814,098	13,330,357	13,450,330	81,600,691	14,244,217	35,953,717	3,214,262	39,863,912	3,057,961
1921..	926,329	19,148,920	13,543,198	8,455,355	47,620,820	5,953,555	66,679,952	3,828,742	53,089,356	2,471,310
1922..	1,263,364	26,116,050	18,626,439	12,576,758	42,879,818	5,738,177	93,307,171	5,817,702	56,290,000	3,217,536
1923..	1,233,341	25,495,441	18,601,744	12,067,509	86,881,537	12,529,186	111,234,466	7,985,522	60,416,240	3,991,701
1924..	1,525,382	31,632,443	19,736,323	13,180,113	104,457,447	13,604,538	175,485,499	14,221,345	98,909,077	6,274,791
1925..	1,735,735	35,880,826	20,228,988	13,971,150	111,450,518	15,649,882	253,590,578	23,127,460	109,268,511	8,328,446
1926..	1,754,228	36,263,110	22,371,924	13,894,531	133,094,942	17,490,300	283,801,265	24,200,661	149,938,105	11,110,413
1927..	1,852,785	38,300,464	22,736,698	12,816,677	140,147,767	17,195,487	311,423,161	16,477,139	165,495,525	10,250,793
1928..	1,890,592	39,082,005	21,936,407	12,761,725	202,696,046	28,598,249	337,946,688	15,553,231	184,647,374	10,143,050
1929..	1,928,308	39,861,663	23,143,261	12,264,308	248,120,760	43,415,251	326,522,566	16,544,248	197,267,087	10,626,778
1930..	2,102,068	43,453,601	26,443,823	10,089,376	303,478,356	37,948,359	332,894,163	13,102,635	267,643,505	9,635,166
1931..	2,693,892	58,093,396	20,562,247	6,141,943	292,304,390	24,114,065	267,342,482	7,260,183	237,245,451	6,059,249
1932..	3,044,387	71,479,373	18,347,907	5,811,081	247,679,070	15,294,058	255,947,378	5,499,704	172,283,558	4,144,454
1933..	2,949,309	84,350,237	15,187,950	5,746,027	299,982,448	21,634,853	266,475,516	6,372,998	199,131,984	6,393,132
1934..	2,972,074	102,536,555	16,415,282	7,790,840	364,761,062	26,671,438	246,276,576	8,436,658	298,579,683	9,087,571
1935..	3,284,890	115,595,279	16,618,558	10,767,148	418,997,700	32,311,960	338,105,079	10,079,720	320,649,595	9,936,908
1936..	3,748,028	131,293,421	18,334,487	8,273,804	421,027,732	39,514,101	383,190,109	14,993,869	333,182,736	11,110,413
1937..	4,096,213	143,326,493	22,977,751	10,312,644	500,028,615	68,917,219	411,999,484	21,053,173	370,337,589	18,153,949
1938..	4,725,117	166,205,990	22,219,195	9,660,239	571,249,664	56,554,034	418,927,660	14,008,941	381,506,588	11,444,454
1939..	5,094,379	184,115,951	23,163,629	9,378,490	608,825,570	60,934,859	388,569,550	12,313,768	394,533,860	12,108,244
1940..	5,115,145	204,479,083	23,833,752	9,116,172	655,593,441	65,773,061	471,850,256	15,863,605	424,028,862	14,463,624
1941..	5,345,179	205,789,392	21,754,408	8,323,454	643,316,713	64,407,497	460,167,005	15,470,815	512,381,636	17,477,337
1942..	4,841,306	186,390,281	20,695,101	8,728,296	603,661,826	60,417,372	512,142,562	17,218,233	580,257,373	19,792,579
Total	85,723,542	2,431,280,820	819,948,250	480,859,059	5,600,120,793	1,004,753,176	7,818,280,620	338,057,085		232,415,202

* From 1858 to 1930, inclusive, gold valued at \$20-671834. From 1931 to 1942 valued at world price of Gold in Canadian Funds.
† From 1895 to 1904, quantities show pounds of zinc contained in ores shipped. From 1905 to 1915, quantities show tons of ore or concentrates shipped from mines. From 1916 to 1942 quantities show recoverable zinc in ores exported plus refined zinc made in Canada. In 1942 production of indium totalled 471 Troy ounces valued at \$4,710.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Nickel		Cobalt		Arsenic		Platinum*		Palladium and other precious metals (b)	
	Pounds	\$	Pounds	\$	Tons	\$	Fine oz.	\$	Fine oz.	\$
1885					440	17,600				
1886					120	5,460				
1887					30	1,200		5,600		
1888					30	1,200		6,000		
1889	830,477	498,286						3,500		
1890	1,435,742	933,232			25	1,500		4,500		
1891	4,035,347	2,421,208			20	1,000		10,000		
1892	2,413,717	1,399,956						3,500		
1893	3,982,982	2,071,151						1,800		
1894	4,907,430	1,870,958			7	420		950		
1895	3,888,525	1,360,984						3,800		
1896	3,397,113	1,188,990						750		
1897	3,997,647	1,399,176						1,600		
1898	5,517,690	1,820,838						1,500		
1899	5,744,000	2,067,840			57	4,872		825		
1900	7,080,227	3,327,707			303	22,725				
1901	9,189,047	4,594,523			695	41,676		457		
1902	10,693,410	5,025,903			800	48,000	2,385	46,502	4,411	86,014
1903	12,505,510	5,002,204			257	15,420	1,710	33,345	3,177	61,952
1904	10,547,853	4,219,153	32,000	19,960			551	10,872	952	18,564
1905	18,876,315	7,550,526	236,000	100,000			574	11,870	1,003	16,746
1906	21,490,955	8,948,834	642,000	80,704	201	14,058	112	3,140	202	2,512
1907	21,189,793	9,535,407	1,478,000	104,426	986	47,303	227	7,032	607	
1908	19,143,111	8,231,538	2,448,000	111,118	1,702	58,566	172	2,807	328	Values
1909	26,282,991	9,461,877	3,066,000	94,965	1,353	67,446	547	13,604	1,271	
1910	37,271,033	11,181,310	2,196,000	54,699	2,049	81,044	258	8,437	753	
1911	34,098,744	10,229,623	1,704,000	170,890	2,097	76,237	666	28,718	523	not
1912	44,841,542	13,452,463	1,868,000	314,381	2,045	89,262	497	22,638	680	
1913	49,676,772	14,903,032	1,642,000	420,386	1,692	101,463	211	9,151	399	
1914	45,517,937	13,655,381	702,000	590,406	1,737	104,015	748	33,765	1,272	complete
1915	68,308,657	20,492,597	412,000	383,261	2,396	147,830	475	22,366	600	
1916	82,958,564	29,035,497	800,000	805,014	2,186	262,349	1,032	85,418	1,602	
1917	84,330,280	33,732,112	674,000	1,138,190	2,936	669,431	1,028	103,661	1,679	
1918	92,504,293	37,002,917	760,000	1,640,310	3,580	563,639	689	71,428	1,260	
1919	44,544,883	17,817,953	598,000	1,019,479	3,389	509,924	667	74,311	1,128	
1920	61,335,706	24,534,282	566,000	1,605,365	2,459	447,848	595	37,680	1,425	
1921	19,293,060	6,752,571	251,986	755,958	1,491	233,763	292	22,599	913	
1922	17,597,123	6,158,993	569,960	1,862,370	2,576	321,037	470	45,863	1,219	
1923	62,453,843	18,332,077	888,061	2,530,974	3,210	626,815	1,217	141,826	2,036	183,560
1924	69,536,350	19,470,178	948,704	1,682,395	2,311	348,293	9,186	1,001,427	9,516	863,113
1925	73,857,114	15,946,672	1,116,492	2,328,517	1,717	130,302	8,698	1,028,192	8,288	648,969
1926	65,714,294	14,374,163	664,778	1,136,014	2,537	146,811	9,521	923,607	10,024	604,178
1927	66,798,717	15,262,171	880,590	1,764,534	3,114	211,979	11,228	717,613	11,545	554,190
1928	96,755,578	22,418,907	956,590	1,672,320	2,716	193,052	10,532	708,909	13,607	627,833
1929	110,275,912	27,115,461	929,415	1,801,915	2,615	171,320	12,519	846,756	17,318	809,289
1930	103,768,857	24,455,123	664,163	1,144,007	2,261	129,527	34,024	1,543,261	34,092	895,867
1931	65,666,320	15,267,453	521,051	651,179	1,787	135,170	44,775	1,596,900	46,913	1,217,717
1932	30,327,968	7,179,862	490,631	587,957	1,212	98,714	27,343	1,099,393	37,613	901,890
1933	83,264,658	20,130,480	466,702	597,752	734	56,534	24,786	857,590	31,069	645,043
1934	128,687,340	32,139,425	594,671	592,497	824	56,412	116,230	4,490,763	83,932	1,699,228
1935	138,516,240	35,345,103	681,419	512,705	1,279	75,326	105,374	3,445,730	84,772	1,969,937
1936	169,739,393	43,876,525	887,591	804,676	683	42,491	131,571	5,320,731	103,671	2,483,075
1937	224,905,046	59,507,176	507,064	843,145	695	41,032	139,377	6,752,816	119,826	3,179,782
1938	210,572,738	53,914,494	456,226	790,013	1,088	56,538	161,326	5,196,794	130,893	3,677,342
1939	226,105,865	50,920,305	732,561	1,213,454	871	52,257	148,902	5,222,589	135,402	4,199,622
1940	245,557,871	59,822,591	794,359	1,235,220	1,047	62,798	108,488	4,240,362	91,522	3,520,746
1941	282,258,235	68,656,795	263,257	255,904	1,769	153,195	124,317	4,750,153	97,432	3,396,304
1942	285,211,803	69,998,427	(a)83,871	88,444	7,484	652,041				
Total	3,619,405,648	995,912,410	34,205,142	33,501,404	77,593	7,396,895				

* From 1887 to 1901 placer platinum only, 1907 to 1920 represents largely, recovery of platinum metal by the International Nickel Company, in New Jersey and not necessarily all from Sudbury ores.

(a) Exclusive of metal in ore placed on government stock pile at Deloro, Ontario.

(b) Data relating to platinum metals prior to 1923 are conjectural in nature and do not necessarily agree with provincial totals.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Titanium ore (a)		Iron ore (*)	Antimony ore		Chromite		Manganese ore		Molybdenite ore and concentrates (d)		Pitch- blende products
	Tons	\$		Tons	\$	Tons	\$	Tons	\$	Tons	\$	
1886.			64,361	665	31,490	60	945	1,789	41,499			
1887.			76,330	584	10,860	38	570	1,245	43,658			
1888.			78,587	345	3,696			1,801	47,944			
1889.			84,181	55	1,100			1,455	32,737			
1890.			76,511	26	625			1,328	32,550			
1891.			68,979	10	60			255	6,694			
1892.			103,248					115	10,250			
1893.			125,602					213	14,578			
1894.			109,991			1,000	20,000	74	4,180			
1895.			91,906			3,177	41,300	125	8,464			
1896.			102,797			2,342	27,004	124	3,975			
1897.			50,705			2,637	32,474	15	1,166			
1898.			58,343	1,344	20,000	2,021	24,252	50	1,600			
1899.			74,617			2,010	21,842	1,581	20,004			
1900.			122,000			2,335	27,000	30	1,800			
1901.			313,646			1,274	16,744	440	4,820			
1902.			404,003			900	13,000	172	4,062	3	400	
1903.			264,294			3,509	51,129	91	2,775	85	1,275	
1904.			219,046			6,074	67,146	66	2,740			
1905.			291,097	527		8,575	93,301	22	1,720			
1906.			248,831	782		9,035	91,859	93	925			
1907.			312,856	2,048	70,108	7,196	72,901	1	22			
1908.			238,082	148	5,443	7,225	82,008					
1909.			268,043	66	5,860	2,470	26,604					
1910.			259,418	364	13,906	299	3,734					
1911.			210,344			157	2,587	6	300			
1912.			215,883					75	1,875			
1913.			307,634									
1914.			244,854			136	1,210	28	1,120	16	2,063	
1915.			398,112	1,371	93,171	12,341	179,543	201	9,360	39	28,920	
1916.			275,176	939	136,360	27,517	311,460	957	89,544	610	188,316	
1917.			215,302	361	22,000	36,725	499,682	158	14,836	1,554	320,006	
1918.			211,608			21,994	867,122	440	6,230	461	428,807	
1919.			197,170			8,541	228,898	661	14,159	46	69,203	
1920.			129,072			11,016	251,379	649	11,029			
1921.			59,509			2,798	55,696	68	3,400			
1922.			17,971			767	11,503	73	2,044			
1923.	69	186	30,690			3,558	52,650	200	1,400			
1924.	1,408	3,771	72					584	4,088	10	9,370	
1925.	3,978	11,934		1	206					15	11,176	
1926.	200	600		1	281					12	10,472	
1927.	2,029	8,980										
1928.	2,244	6,732										
1929.	2,748	7,359				126	900			9	6,400	
1930.	412	1,239						273	1,356			
1931.	1,509	10,261						117	2,893	1	280	
1932.						78	1,113					
1933.						30	343					(e) 247,900
1934.	2,023	14,161				111	1,578					159,400
1935.	2,288	16,400				1,144	14,947	100	800			413,700
1936.	2,566	18,318		Pounds		923	13,578	221	1,596			605,500
1937.	4,229	26,432		(b) 48,163	7,394	4,272	43,250	85	817	8	8,147	876,540
1938.	207	1,449		24,560	2,200					6	4,500	1,045,458
1939.	3,694	21,267	123,598	1,225,585	151,469			396	3,688	1	816	1,121,553
1940.	4,535	24,510	414,603	2,594,492	396,468	335	5,780	152	4,315	11	10,280	410,176
1941.	12,651	49,110	516,037	3,185,077	445,911	2,372	42,679	(c)	(c)	98	88,470	925,196
1942.	10,031	50,906	545,306	3,041,108	516,988	11,456	343,568	435	8,932	114	134,963	(f)
							3,643,279	16,964	471,945	3,099	1,323,864	

(*) Includes some titaniferous ore prior to 1923.

(a) See footnote above. (b) Includes metal produced in Canada plus metal in ores exported, 1937 to 1942.

(c) 7,500 pounds of manganese metal valued at \$2,250 produced at a Nova Scotia mine. (d) Sales, including MoS₂ consumed at Quyon, Quebec.

(e) First production.

(f) Not available for publication.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Tungsten concentrates		Selenium		Tellurium		Cadmium		Bismuth	
	lb.	\$	lb.	\$	lb.	\$	lb.	\$	lb.	\$
1912.....	28,000	(a)								
1913.....										
1914.....										
1915.....										
1916.....										
1917.....	580	234								
1918.....	27,000	11,700								
1919.....										
1920.....										
1921.....										
1922.....										
1923.....										
1924.....									12,863	27,913
1925.....									19,667	18,566
1926.....									6,440	6,440
1927.....									2,072	1,033
1928.....							491,894	341,374	14,002	5,067
1929.....							773,976	675,294	194,329	307,114
1930.....							456,582	337,871	12,732	6,366
1931.....			21,500	40,850			323,139	180,958	118,207	157,650
1932.....							65,425	26,824	16,855	7,340
1933.....			48,221	70,345			246,041	78,733	78,303	81,526
1934.....			104,924	171,311	5,130	25,599	293,611	95,665	253,644	301,215
1935.....			366,425	703,536	16,425	32,850	580,530	441,203	13,797	13,245
1936.....			350,857	621,017	35,591	62,997	785,916	699,465	364,165	360,523
1937.....			397,227	687,203	41,490	71,777	745,207	1,222,140	5,711	5,654
1938.....			358,929	622,742	48,237	82,967	699,138	561,799	9,516	9,754
1939.....	8,825	4,917	150,771	266,714	2,940	4,769	939,691	662,209	409,449	466,362
1940.....	12,002	7,303	179,860	343,533	3,491	5,607	908,127	1,056,152	58,529	81,004
1941.....	82,846	38,712	406,930	777,236	11,453	18,394	1,251,291	1,469,016	7,511	10,396
1942.....	520,981	406,275	495,369	951,108	11,084	17,735	1,148,963	1,355,776	347,556	479,627
Total.....			2,881,013	5,255,595	175,841	322,695	9,709,531	9,204,479	1,945,348	2,346,795

(a) Value not recorded.

NOTE.—Total commercial production of tin from Canadian ores was as follows:—1941, 64,744 pounds valued at \$33,667; 1942, 1,237,863 pounds valued at \$643,689. Production of magnesium from Canadian ores totalled 10,905 pounds in 1941, valued at \$2,944 and 808,718 pounds valued at \$355,836 in 1942; the metal was produced commercially for the first time in Canada from Canadian ores, in 1941.

Table 9.—Aluminium Production in Canada from Imported Ores 1901-1943

Year	Pounds	Year	Pounds	Year	Pounds	Year	Pounds	Year	Pounds
1901....	283,737	1911....	9,679,980	1921....	6,335,083	1931....	68,103,008	1941....	427,746,554
1902....	1,983,252	1912....	12,029,046	1922....	12,867,305	1932....	39,585,847	1942....	681,192,951
1903....	1,750,599	1913....	14,065,028	1923....	24,245,766	1933....	35,532,104	1943....	991,499,296
1904....	2,302,178	1914....	14,550,959	1924....	27,243,004	1934....	34,865,362		
1905....	2,590,329	1915....	18,368,524	1925....	31,105,293	1935....	46,342,747		
1906....	4,696,949	1916....	21,184,791	1926....	38,910,914	1936....	59,280,250		
1907....	5,921,299	1917....	22,088,067	1927....	82,735,938	1937....	93,812,965		
1908....	972,146	1918....	23,535,689	1928....	82,797,804	1938....	142,407,743		
1909....	6,083,695	1919....	21,582,264	1929....	63,439,528	1939....	165,680,869		
1910....	9,647,958	1920....	22,384,702	1930....	76,217,209	1940....	218,288,565		

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Mercury		Coal*		Petroleum		Natural Gas		Peat Fuel	
	pounds	\$	tons	\$	brls.	\$	M cu. ft.	\$	tons	\$
1785-1866.....			2,863,826	4,905,462						
1867.....			631,320	1,056,725						
1868.....			623,392	1,073,061						
1869.....			687,825	1,155,282						
1870.....			752,635	1,243,139						
1871-1873.....			3,033,152	5,073,331						
1874.....			1,063,742	1,763,423						
1875.....			1,039,974	1,747,016						
1876.....			994,762	1,729,546						
1877.....			1,036,670	1,794,415						
1878.....			1,089,744	1,941,285						
1879.....			1,126,497	2,050,639						
1880.....			1,482,714	2,657,194						
1881.....			1,537,106	2,688,821	368,987					
1882.....			1,848,148	3,248,446	389,573					
1883.....			1,818,684	3,109,635	472,866					
1884.....			1,984,959	3,593,831	571,000					
1885.....			1,920,977	3,417,807	587,563					
1886.....			2,116,653	3,739,840	584,061	525,655				
1887.....			2,429,330	4,388,206	713,728	556,708				
1888.....			2,602,552	4,674,140	695,203	713,695				
1889.....			2,658,303	4,894,287	704,690	653,600				
1890.....			3,084,682	5,676,247	795,080	902,734				
1891.....			3,577,749	7,019,425	755,298	1,010,211				
1892.....			3,287,745	6,363,757	779,753	984,438	150,000			
1893.....			3,783,499	7,359,080	798,406	874,255	376,233			
1894.....			3,847,070	7,429,468	829,104	835,322	313,754			
1895.....	5,396	2,343	3,478,344	6,739,153	726,182	1,086,738	423,032			
1896.....	4,408	1,940	3,745,716	7,226,462	726,822	1,155,647	276,301			
1897.....	684	324	3,786,107	7,303,597	709,857	1,011,546	325,873			
1898.....			4,173,108	8,224,288	758,391	1,061,747	322,123			
1899.....			4,925,051	10,283,497	808,570	1,202,020	387,271			
1900.....			5,777,319	13,742,178	710,498	1,151,007	417,094	400	1,200	
1901.....			6,486,325	12,699,243	622,392	1,008,275	339,476	220	600	
1902.....			7,466,681	15,210,877	530,624	951,190	195,992	475	1,663	
1903.....			7,960,364	15,942,833	486,637	1,048,874	202,210	1,100	3,300	
1904.....			8,254,595	16,592,231	503,474	935,895	328,376	800	2,400	
1905.....			8,667,948	17,520,263	634,095	856,028	379,561	80	260	
1906.....			9,762,601	19,732,019	569,753	761,760	583,523	474	1,422	
1907.....			10,511,426	24,381,842	788,872	1,057,088	815,032	50	200	
1908.....			10,886,311	25,194,573	527,987	747,102	1,012,660	60	180	
1909.....			10,501,475	24,781,236	420,755	559,604	1,207,029	60	240	
1910.....			12,909,152	30,909,779	315,895	388,550	1,346,471	841	2,604	
1911.....			11,323,388	26,467,646	291,092	357,073	1,917,678	1,463	3,817	
1912.....			14,512,829	36,019,044	243,336	345,050	2,362,700	700	2,900	
1913.....			15,012,178	37,334,940	228,080	406,439	20,477,838	3,309,381	2,600	10,100
1914.....			13,637,529	33,471,801	214,805	343,124	21,692,504	3,484,727	685	2,470
1915.....			13,267,023	32,111,182	215,464	300,572	20,124,162	3,706,035	300	1,050
1916.....			14,483,395	38,817,481	198,123	392,284	25,467,458	3,958,029	300	1,500
1917.....			14,046,759	43,199,831	213,832	542,239	27,408,940	5,045,298		
1918.....			14,977,926	55,192,896	304,741	885,143	20,140,309	4,350,940		
1919.....			13,919,096	55,622,670	240,466	736,324	19,937,769	4,176,037	986	6,561
1920.....			16,946,764	82,496,538	196,251	822,235	16,845,518	4,232,642	4,550	18,650
1921.....			15,057,493	72,451,656	187,541	641,533	14,077,601	4,594,164	1,666	6,664
1922.....			15,157,431	65,518,497	179,068	611,176	14,682,651	5,846,501	3,000	14,500
1923.....			16,990,571	72,058,986	170,169	522,018	15,960,583	5,884,618		
1924.....			13,638,197	53,953,988	160,773	467,400	14,881,336	5,708,636		
1925.....	380	(a)	13,134,968	49,261,951	332,001	1,250,705	16,902,897	6,833,005	1,370	8,394
1926.....			16,478,311	59,875,094	364,444	1,311,665	19,208,209	7,557,174		
1927.....			17,426,861	61,867,463	476,591	1,516,043	21,376,791	8,043,010		
1928.....			17,564,293	63,757,833	624,184	2,035,300	22,582,586	8,614,182	1,497	5,845
1929.....			17,496,557	63,065,170	1,117,368	3,731,764	28,378,462	9,977,124	2,607	13,339
1930.....			14,881,324	52,849,748	1,522,220	5,033,820	29,376,919	10,289,985	2,847	10,932
1931.....			12,243,211	41,207,682	1,542,573	4,211,674	25,874,723	9,026,754	1,674	7,033
1932.....			11,738,913	37,117,695	1,044,412	3,022,592	23,420,174	8,899,462	3,248	7,593
1933.....			11,903,344	35,923,962	1,145,333	3,138,791	23,138,103	8,712,234	1,131	3,449
1934.....			13,810,193	42,045,942	1,410,895	3,449,162	23,162,324	8,759,652	1,878	7,343
1935.....			13,888,006	41,963,110	1,446,620	3,492,188	24,910,786	9,363,141	1,340	5,761
1936.....			15,229,182	45,791,934	1,500,374	3,421,767	28,113,348	10,762,243	1,471	7,376
1937.....			15,835,954	48,752,048	2,543,750	5,399,353	32,380,991	11,674,802	1,348	2,676
1938.....	760	760	14,294,718	43,982,171	6,966,084	9,230,173	33,444,791	11,587,450	620	3,500
1939.....	436	1,226	15,692,698	48,676,990	7,826,301	9,846,352	35,185,146	12,507,307	445	2,445
1940.....	153,830	369,317	17,566,884	54,675,844	8,590,978	11,160,213	41,232,125	13,000,593	30	75
1941.....	536,304	1,335,697	18,225,921	58,059,630	10,133,838	14,415,096	43,495,353	12,665,113	355	2,155
1942.....	1,035,914	2,943,807	18,865,030	62,897,581	10,364,796	15,968,851	45,697,359	13,301,655	172	1,204
Total.....			651,463,000	1,968,406,583	81,282,525	131,047,808	249,554,283	41,843	171,401	

* For the years 1919 to 1942 the tonnage shown is the total output of all mines; for previous years the tonnage shown includes only sales, colliery consumption and coal used by the operators.

(a) No value recorded.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Peat Moss		Actinolite		Asbestos		Barite		Bituminous Sands		Corundum	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1880					380	24,700						
1881					540	35,100						
1882					810	52,650						
1883					955	68,750						
1884					1,141	75,097						
1885					2,440	142,441	300	1,500				
1886					3,458	206,251	3,864	19,270				
1887					4,619	226,976	400	2,400				
1888					4,404	255,007	1,100	3,850				
1889					6,113	426,554						
1890					9,860	1,260,240	1,842	7,543				
1891					9,279	999,878						
1 92					6,082	390,462	315	1,260				
1893					6,331	310,156						
1894					7,630	420,825	1,081	2,830				
1895					8,756	368,175						
1896					12,250	429,856	145	715				
1897			205	1,845	30,442	445,368	571	3,060				
1898					23,785	491,197	1,125	5,533				
1899					25,536	485,849	720	4,402				
1900					29,141	748,431	1,337	7,605			3	300
1901			521	3,126	40,217	1,259,759	653	3,842			387	46,415
1902			550	4,400	40,416	1,148,319	1,096	3,957			768	84,465
1903			550	3,108	41,677	929,757	1,163	3,931			703	77,510
1904					48,465	1,226,352	1,382	3,702			993	109,545
1905					68,263	1,503,259	3,360	7,500			1,644	149,153
1906					82,185	2,060,143	4,000	12,000			2,274	204,973
1907					90,426	2,505,042	1,344	3,000			1,892	177,922
1908					90,773	2,573,335	4,312	19,021			1,089	100,398
1909					87,300	2,301,775	179	1,120			1,491	162,492
1910			30	330	102,215	2,573,603					1,870	198,680
1911			67	736	127,414	2,943,108	50	400			1,472	161,873
1912			92	1,000	136,301	3,137,279	464	5,104			1,960	239,091
1913			66	720	161,086	3,849,925	641	5,410			1,177	137,036
1914			119	1,304	117,573	2,909,806	612	6,169			548	72,176
1915			220	2,420	136,842	3,574,985	550	6,875			262	33,138
1916			250	2,750	154,149	5,228,869	1,368	19,393			67	10,307
1917			120	1,320	153,781	7,230,383	3,490	54,027			188	32,153
1918			228	2,508	158,259	8,970,797	640	10,165			137	26,112
1919			80	880	159,236	10,975,369	468	8,154				
1920			100	1,160	199,573	14,792,201	751	22,983			196	24,547
1921			78	975	92,761	4,906,230	270	9,567			403	55,965
1922			50	575	163,706	5,552,723	289	9,537				
1923			53	583	231,482	7,522,506	409	8,548				
1924			90	1,225	225,744	6,710,830	151	3,308	531	2,127		
1925			40	500	273,524	8,977,546	95	2,259	1,148	4,594		
1926			80	1,000	279,403	10,099,423	100	2,307	528	2,112		
1927			86	1,075	274,778	10,621,013	56	1,268	2,706	10,824		
1928			70	875	273,033	11,238,360	127	2,847	94	374		
1929			30	375	306,055	13,172,581	105	2,341	989	3,956		
1930			34	437	242,114	8,390,163	66	1,484	2,067	8,268		
1931			35	456	164,296	4,812,886	16	363	1,015	4,060		
1932					122,977	3,039,721			343	1,372		
1933					158,367	5,211,177	20	60	466	1,662		
1934			30	365	155,980	4,936,326			862	3,449		
1935					210,467	7,054,614			40	160		
1936					301,287	9,958,183						
1937					410,026	14,505,791			35	142		
1938					289,793	12,890,195						
1939					364,472	15,859,212	323	3,639				
1940	(a)	(a)			346,805	15,619,865	338	4,819	(b)	(b)		
1941	27,803	644,253			477,846	21,468,840	6,890	74,416	(b)	(b)		
1942	53,506	1,069,372			439,459	22,663,283	19,667	188,144	(b)	(b)		
			3,874	36,048	8,194,478	314,769,497	68,245	571,628			19,524	2,104,251

(a) Prior to 1941 included in survey of manufactures.

(b) No sands sold as such; production included with crude petroleum.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Diatomite		Feldspar		Fluorspar		Graphite		Grindstones		Garnets	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1886							500	4,000	4,020	46,545		
1887							300	2,400	5,292	64,008		
1888							150	1,200	5,764	51,129		
1889							242	3,160	3,404	30,863		
1890			700	3,500			175	5,200	4,884	42,340		
1891			685	3,425			260	1,560	4,479	42,587		
1892			175	525			167	3,763	5,122	49,836		
1893			576	4,525					4,480	36,979		
1894							5	400	3,667	31,217		
1895			1,018	2,545			220	6,150	3,395	30,652		
1896	644	9,960	972	2,583			789	22,455	3,563	31,960		
1897	15	150	1,400	3,290			436	16,240	4,472	40,740		
1898	1,017	16,660	2,500	6,250			660	13,698	4,735	40,590		
1899	1,000	15,000	3,000	6,000			1,310	24,179	4,112	35,265		
1900	336	1,950	318	1,112			1,922	31,040	5,179	47,290		
1901	850	15,300	5,350	10,700			2,210	38,780	4,034	37,275		
1902	1,052	16,470	7,576	15,152			1,095	28,300	4,383	40,018		
1903	835	16,700	13,928	18,966			728	23,745	5,423	46,462		
1904	320	6,400	11,083	22,166			452	11,760	4,509	40,822		
1905	300	3,600	11,700	23,400	12	84	541	16,735	5,460	59,900		
1906			16,948	40,890			387	18,300	5,305	58,314		
1907	30	225	12,584	29,819			579	16,000	5,384	58,876		
1908	30	195	7,877	21,099			251	5,565	3,658	42,053		
1909			12,783	40,383			864	47,800	4,002	46,374		
1910	22	134	15,809	47,667	2	15	1,392	74,087	3,787	41,496		
1911	20	122	17,723	51,939	34	238	1,269	69,576	4,332	46,832		
1912	38	230	13,733	30,916	40	240	2,060	117,122	4,204	46,460		
1913	620	12,138	16,790	60,795			2,162	90,282	4,008	45,300		
1914	650	13,000	18,060	70,824			1,647	107,203	3,783	48,847		
1915	317	12,119	14,559	57,801			2,635	124,223	2,279	31,967		
1916	620	12,139	19,488	71,407	1,284	10,238	3,955	325,362	3,232	49,975		
1917	600	18,000	19,462	89,826	4,249	68,756	3,714	402,892	2,169	38,702		
1918	500	12,500	18,782	112,728	7,362	156,029	3,114	248,870	2,806	70,745		
1919	565	11,300	14,679	86,231	5,063	97,837	1,360	100,221	1,931	56,344		
1920	260	8,600	37,873	280,895	11,235	240,446	2,190	165,617	2,262	74,119		
1921	341	11,268	29,868	230,754	5,519	136,267	937	65,862	1,064	40,637		
1922	219	5,781	27,727	248,402	4,503	102,138	597	31,353	837	30,292		
1923	130	3,250	29,225	237,601	139	1,732	1,113	67,873	1,717	51,483	1,250	100,000
1924	33	838	44,804	358,540	76	1,343	1,334	76,117	2,031	69,111	360	7,200
1925			28,681	235,789	3,886	19,234	2,569	158,763	1,735	61,784		
1926			35,951	310,238			2,727	194,860	1,513	58,986		
1927	266	6,650	29,849	259,151			1,829	111,656	1,317	47,475	2	150
1928	368	8,960	31,897	284,942			1,097	57,041	1,250	45,901		
1929	429	10,330	37,527	340,471	17,870	268,120	1,461	103,174	1,038	37,401		
1930	554	13,247	26,796	268,469	80	1,240	1,535	96,392	235	9,874		
1931	1,610	32,789	18,343	186,961	40	620	548	32,149	198	8,164		
1932	1,496	29,609	7,047	81,982	32	464	346	18,483	200	9,336		
1933	1,789	36,648	10,658	105,117	73	1,064	405	18,367	161	7,079		
1934	1,372	54,910	18,302	147,281	150	2,100	1,518	71,424	353	14,543		
1935	823	33,140	17,742	144,330	75	900	1,782	79,781	373	14,501		
1936	615	13,650	17,846	154,475	75	900		88,812	360	15,352		
1937	643	18,606	21,346	178,222	150	2,550		125,343	251	12,407		
1938	398	13,842	14,058	129,293	217	3,906		41,590	285	12,790		
1939	301	10,388	12,500	112,309	240	4,995		61,684	284	12,190		
1940	248	7,957	21,455	187,623	4,454	59,317		94,038	290	11,858		
1941	344	9,935	26,040	244,284	5,534	97,767		132,924	170	8,500	16*	160
1942	365	9,088	22,270	213,941	6,199	146,039		117,904	200	8,000	17*	176
Total...	22,985	533,678	848,062	5,877,534	78,593	1,424,579	.....	4,013,475	159,381	2,190,546	1,645	107,686

*Garnet schist.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Gypsum		Iron Oxides		Magnesitic Dolomite		Magnesium Sulphate		Manganese Bog	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1874	67,830	68,164								
1875	91,485	91,613								
1876	92,765	94,386								
1877	111,980	98,897								
1878	105,455	93,805								
1879	104,993	80,864								
1880	136,935	124,060								
1881	121,270	116,349								
1882	150,272	147,597								
1883	166,152	169,228								
1884	130,141	134,451								
1885	97,552	106,415								
1886	162,000	178,742	350	2,350						
1887	154,005	157,277	485	3,733						
1888	175,887	179,393	397	7,900						
1889	213,273	205,108	794	15,280						
1890	226,509	194,033	275	5,125						
1891	203,605	206,251	900	17,750						
1892	241,048	241,127	390	5,800						
1893	192,568	196,150	1,070	17,700						
1894	223,631	202,031	611	8,690						
1895	226,178	202,608	1,339	14,600						
1896	207,032	178,061	2,362	16,045						
1897	239,691	244,531	3,905	23,560						
1898	219,256	232,515	2,226	17,450						
1899	244,566	257,329	3,919	20,000						
1900	252,101	259,009	1,966	15,398						
1901	293,799	340,148	2,233	16,735						
1902	333,599	379,479	4,955	30,495						
1903	314,489	388,459	6,266	32,760						
1904	345,961	373,474	3,925	24,995						
1905	442,158	586,168	5,105	34,675						
1906	469,022	643,294	6,758	36,125						
1907	485,921	646,914	5,828	35,570						
1908	340,984	575,701	4,746	30,440	120	840				
1909	473,129	809,632	3,940	28,093	330	2,508				
1910	525,246	934,446	4,813	35,185	323	2,160				
1911	518,383	993,394	3,622	28,333	991	5,531				
1912	578,458	1,324,620	7,654	32,410	1,714	9,645				
1913	636,370	1,447,739	5,987	41,774	515	3,335				
1914	516,880	1,156,207	5,890	51,725	358	2,240				
1915	474,815	854,929	6,248	48,353	14,779	126,584				
1916	342,915	738,593	8,811	58,711	55,413	563,829				
1917	336,332	881,984	9,409	87,605	58,090	728,275	929	4,645		
1918	152,287	823,006	17,317	112,440	39,365	1,016,765	1,949	14,565		
1919	299,063	1,215,287	11,862	113,427	11,273	328,465	738	9,115		
1920	429,144	1,893,991	19,128	157,909	18,378	512,756	1,947	39,886		
1921	386,550	1,785,538	9,048	93,610	3,730	81,320	2,029	39,506		
1922	559,265	2,160,898	7,285	110,608	2,849	76,294	1,021	24,017		
1923	578,301	2,243,100	10,424	129,636	4,801	134,382	121	6,580		
1924	646,016	2,208,108	7,266	91,160	3,873	101,356				
1925	740,323	2,389,891	7,118	91,913	5,576	122,325				
1926	883,728	2,770,813	6,626	101,843	4,571	137,431				
1927	1,063,117	3,251,015	6,125	103,536	7,337	230,309				
1928	1,246,368	3,743,648	5,414	111,198	13,195	346,990			385	2,237
1929	1,211,689	3,345,696	6,518	115,932	18,809	491,170			301	1,830
1930	1,070,968	2,818,788	6,596	83,873	13,336	336,162			275	1,650
1931	863,752	2,111,517	5,520	49,205	11,411	525,579			77	462
1932	438,629	1,080,379	5,240	46,161	(e)	262,860				
1933	382,736	675,822	4,357	53,450	(e)	360,128	120	3,360		
1934	461,237	863,776	4,959	66,166	(e)	382,927	42	1,100		
1935	541,864	932,203	5,516	77,075	(e)	486,084	340	7,965		
1936	833,822	1,278,971	5,854	69,630	(e)	768,742	654	13,712		
1937	1,047,187	1,540,483	6,197	83,640	(e)	677,207	727	14,456		
1938	1,008,799	1,502,265	5,821	71,769	(e)	420,261	470	9,400		
1939	1,421,934	1,935,127	6,015	88,418	(e)	474,418	550	9,900		
1940	1,448,788	2,065,933	9,979	111,874	(e)	897,016				
1941	1,593,406	2,248,428	10,045	142,069	(e)	831,041	265	7,343		
1942	566,166	1,254,182	9,304	151,653	(e)	*1,059,374	1,140	38,760		
Total	31,861,763	65,674,040	316,713	3,273,560		12,276,309	13,042	244,310	1,038	6,179

(e) Quantity not published since 1931.

* Includes value of brucite granules shipped from Wakefield, Quebec to Canadian Refractories Ltd.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Mica		Mineral Waters		Natro-Alunite		Phosphate		Pulpstones	
	Tons	\$	Imp. gals	\$	tons	\$	tons	\$	tons	\$
1870.....							1,200	13,600		
1871.....							200	2,100		
1872.....										
1873.....										
1874.....										
1875.....										
1876.....										
1877.....										
1878.....							10,743	208,109		
1879.....							8,446	122,035		
1880.....							13,060	190,086		
1881.....							11,968	218,456		
1882.....							17,153	308,357		
1883.....							19,716	427,668		
1884.....							21,709	424,240		
1885.....							28,969	496,293		
1886.....		29,003					20,495	304,338		
1887.....		29,816					23,690	319,815		
1888.....	15	30,207	124,850	11,456			22,485	242,285		
1889.....		28,718	424,600	37,360			30,988	316,662		
1890.....		68,074	561,165	66,031			31,753	361,045		
1891.....		71,510	427,485	54,268			23,588	241,603		
1892.....		104,745	640,380	75,348			11,932	157,424	60	900
1893.....		75,719	725,096	108,347			7,890	61,962	120	1,400
1894.....		45,581	767,460	110,040			6,861	41,166	90	1,500
1895.....		65,000	739,382	126,048			1,822	9,565	80	1,280
1896.....		60,000	706,372	111,736			570	3,420	60	900
1897.....		76,000	749,691	141,477			908	3,984	100	1,600
1898.....		118,375	555,000	100,000			733	3,665	200	3,200
1899.....		163,000		100,000			3,000	18,000	375	7,000
1900.....		166,000		75,000			1,415	7,105	360	6,160
1901.....		160,000		100,000			1,033	6,280	547	8,415
1902.....	1,059	135,904		100,000			856	4,953	250	4,100
1903.....		177,857		100,000			1,329	8,214	115	1,840
1904.....		160,777		100,000			817	4,590	140	1,960
1905.....		178,235		100,000			1,300	8,425	68	1,875
1906.....	574	303,913		100,000			850	6,375	40	600
1907.....	774	312,599		136,020			824	6,015		
1908.....	436	139,871		151,953			1,596	14,794	158	4,725
1909.....	369	147,782		175,173			998	8,054	240	6,640
1910.....	758	190,385		199,563			1,478	12,578	125	3,700
1911.....	590	128,677		223,758			621	5,206	160	3,960
1912.....	580	143,976		172,465			164	1,640	125	4,000
1913.....	1,104	194,304		173,677			385	3,643	100	3,400
1914.....	595	109,061		134,111			954	7,275	40	4,000
1915.....	417	91,905		115,274			217	2,502		
1916.....	1,208	255,239		127,806			203	2,514		
1917.....	1,166	358,851		145,814			149	1,486	47	2,750
1918.....	747	271,550		154,468			140	1,200	180	8,400
1919.....	2,754	273,788		71,015			24	331	14	420
1920.....	2,203	376,022		24,582					125	10,000
1921.....	702	70,063	328,723	21,716	30	1,500	30	450	200	22,000
1922.....	3,349	152,263	221,433	14,220	50	2,500	190	1,796	150	12,000
1923.....	3,525	326,974	232,451	16,455	15	750	30	600	260	25,100
1924.....	4,091	357,272	209,353	15,421					624	58,113
1925.....	4,020	261,463	190,134	28,413	20	1,000	16	189	781	57,781
1926.....	2,545	229,204	215,356	29,721			40	800	1,155	89,541
1927.....	2,738	174,377	303,530	14,624	7	248	151	1,717	911	75,242
1928.....	3,680	87,168	269,045	33,498			641	8,276	581	52,659
1929.....	4,053	118,549	321,905	16,139			1,185	5,380	754	62,336
1930.....	1,170	96,004	227,141	24,481			40	760	573	49,897
1931.....	1,339	54,066	217,408	13,234					342	27,305
1932.....	309	6,828	76,714	7,170			1,316	12,333	60	3,500
1933.....	944	49,254	38,818	5,441			2,214	5,475	214	9,870
1934.....	968	97,071	97,440	17,738			81	683	523	27,225
1935.....	628	82,088	146,516	16,590			188	1,103	288	14,109
1936.....	801	74,556	154,286	18,516			525	4,927	87	4,500
1937.....	945	133,731	225,019	20,586			100	927	87	4,875
1938.....	518	80,989	188,309	21,619			208	1,886		
1939.....	1,068	147,321	128,679	19,105			157	1,712		
1940.....	975	237,145	140,663	20,892			358	4,039		
1941.....	1,743	335,288	181,064	72,531			2,487	33,376		
1942.....	3,010	383,567	157,085	74,505			1,204	17,431		
Total....		8,797,670		4,245,405	122	5,998	346,451	4,712,894	11,509	690,778

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Nepheline Syenite	Quartz*		Salt		Sharpening Stones		Silica Brick		Sodium Carbonate	
		tons	\$	tons	\$	tons	\$	M	\$	tons	\$
1886				62,359	227,195						
1887				60,173	166,394						
1888				59,070	185,400						
1889				32,832	129,547						
1890		200	1,000	43,754	198,887						
1891				45,021	161,179						
1892				45,486	162,041						
1893		100	500	62,324	195,926						
1894				57,199	170,687						
1895				52,376	160,455						
1896		10	50	43,960	169,693						
1897				51,348	225,730						
1898		284	570	57,142	248,639	33	985				
1899		600	1,260	59,339	254,390	24	1,000				
1900				62,085	275,458						
1901				59,428	262,328						
1902				64,456	262,581						
1903				62,452	297,517						
1904				69,477	321,778						
1905				67,340	320,858	12	600				
1906		48,376	65,765	76,720	329,130	18	900				
1907		56,585	124,148	72,697	342,315	30	1,500				
1908		44,741	52,830	79,975	378,798	27	1,350				
1909		56,924	71,285	84,037	415,219	33	1,650				
1910		88,205	91,951	84,092	409,624	36	1,800				
1911		60,526	83,865	91,582	443,004	54	2,000				
1912		100,242	195,216	95,053	459,582	38	1,300				
1913		78,261	169,842	100,791	491,280	74	2,425				
1914		54,148	84,583	107,038	493,648	115	1,254				
1915		127,108	205,153	119,900	600,226	281	3,615				
1916		136,745	251,226	132,903	717,653	224	2,614				
1917		216,288	496,182	138,909	1,047,792	307	4,302				
1918		268,155	629,813	131,727	1,285,039	56	3,500				
1919		94,991	527,635	148,301	1,397,929	45	3,392				
1920		128,295	467,821	209,855	1,544,724	56	3,987				
1921		100,350	312,947	164,658	1,673,685	17	1,430			197	14,775
1922		109,947	208,598	181,794	1,628,323	18	1,450			202	3,027
1923		264,076	599,250	202,397	1,713,516	35	3,500			265	3,975
1924		150,896	323,156	207,979	1,374,780	36	3,600			510	5,173
1925		197,224	363,612	233,746	1,410,697	46	4,600			1,120	8,140
1926		232,082	553,161	262,547	1,480,149	27	2,700	2,665	130,702	595	5,370
1927		233,984	496,364	268,672	1,614,667	23	2,300	1,791	79,527	805	9,995
1928		282,522	523,933	299,445	1,495,971	24	2,400	3,224	155,502	519	4,922
1929		265,949	561,527	330,264	1,578,086	155	6,617	3,951	173,581	600	8,100
1930		226,200	418,127	271,695	1,694,631	22	2,250	2,418	97,379	364	4,550
1931		195,724	303,158	259,047	1,904,149	81	2,634	900	35,746	712	7,351
1932		189,132	276,147	263,543	1,947,551	68	2,899	93	4,304	495	5,450
1933		185,783	297,820	280,115	1,939,874	123	4,970	636	23,185	559	5,773
1934		272,563	482,265	321,753	1,954,953	111	4,710	2,528	85,945	244	1,920
1935		233,002	424,882	360,343	1,880,978	47	5,400	2,461	96,194	242	2,430
1936		1,046,649	597,781	391,316	1,773,144	122	4,872	2,393	97,285	192	1,677
1937		121,481	1,377,448	1,129,011	458,957	74	4,147	3,744	181,126	286	2,574
1938		142,737	1,380,011	961,617	440,045	21	3,408	1,788	100,403	252	2,268
1939		140,148	1,582,935	1,100,214	424,500	20	3,088	2,493	124,807	300	2,400
1940		117,849	1,858,302	1,203,527	464,714	(a) 51	2,685	3,438	182,786	220	1,760
1941		227,583	2,052,878	1,366,187	560,845	18	3,000	4,111	238,433	186	1,488
1942		246,893	1,738,174	1,538,162	653,672	16	2,000	4,273	263,006	256	2,048
Total		1,034,117	15,736,615	17,562,141	10,093,218	2,618	112,834	42,907	2,069,911	9,121	105,166

* Commencing in 1936 includes low-grade fluxing sand.

(a) Includes 33 tons grinding pebbles valued at \$165, from Saskatchewan.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Sodium Sulphate		Sulphur*		Talc and Soapstone		Volcanic Dust	
	tons	\$	tons	\$	tons	\$	tons	\$
1886.....			42,906	193,077	50	400		
1887.....			38,043	171,194	100	800		
1888.....			63,479	285,656	140	280		
1889.....			72,225	307,292	195	1,170		
1890.....			49,227	123,067	917	1,239		
1891.....			25,542	203,193				
1892.....			26,000	179,310	1,374	6,240		
1893.....			22,245	175,626	717	1,920		
1894.....			16,616	121,581	916	1,640		
1895.....			14,021	102,594	475	2,138		
1896.....			13,823	101,155	410	1,230		
1897.....			15,953	116,730	157	350		
1898.....			13,209	128,872	405	1,000		
1899.....			11,352	110,748	450	1,960		
1900.....			16,413	155,164	1,420	6,365		
1901.....			14,457	130,544	259	842		
1902.....			14,603	138,939	689	1,804		
1903.....			13,933	127,713	990	2,739		
1904.....			15,244	134,033	840	1,875		
1905.....			13,669	125,486	500	1,800		
1906.....			17,525	169,990	1,234	3,030		
1907.....			18,960	212,491	1,534	4,602		
1908.....			19,408	224,824	1,016	3,048		
1909.....			26,504	222,814	4,350	10,300		
1910.....			22,087	187,062	7,112	22,308		
1911.....			33,893	365,820	7,300	22,100		
1912.....			33,426	314,081	8,270	23,132		
1913.....			65,012	521,181	12,250	45,980		
1914.....			93,609	744,508	10,808	40,418		
1915.....			116,157	985,190	11,885	40,554		
1916.....			116,975	1,084,095	13,104	49,423		
1917.....			155,453	1,610,762	15,808	76,539		
1918.....			154,269	1,705,219	18,169	119,197		
1919.....			65,674	522,704	18,642	116,295		
1920.....	811	19,496	67,608	719,110	21,671	166,934		
1921.....	623	18,850	12,213	116,326	10,124	144,565		
1922.....	504	11,980	6,900	74,303	13,195	188,458		
1923.....	733	10,189	11,073	113,020	10,366	150,507		
1924.....	1,083	6,004	9,742	95,620	11,332	154,480	245	1,103
1925.....	3,876	19,380	7,587	58,899	14,474	205,835	160	1,380
1926.....	6,775	13,550	8,975	63,899	15,767	217,195	90	630
1927.....	5,659	11,319	25,229	198,388	16,521	235,105	105	735
1928.....	6,016	68,804	38,589	321,033	16,058	219,358	485	9,795
1929.....	5,018	64,112	42,781	350,843	16,698	229,198	300	6,000
1930.....	31,571	293,847	37,730	314,835	27,247	186,216	242	4,840
1931.....	44,957	421,097	50,107	429,457	21,916	157,083	128	2,560
1932.....	22,466	271,736	53,172	470,014	13,275	159,038	180	3,600
1933.....	50,080	485,416	57,373	510,299	16,829	190,836	118	2,360
1934.....	66,821	587,986	51,537	515,502	15,532	180,777	31	620
1935.....	44,817	343,764	67,446	634,235	15,301	171,532		
1936.....	75,598	552,681	122,132	1,033,055	16,587	177,270		
1937.....	79,884	618,028	130,913	1,154,992	15,939	163,814		
1938.....	63,000	553,307	112,395	1,044,817	13,814	144,848		
1939.....	71,485	628,151	211,278	1,668,025	18,241	170,066		
1940.....	94,260	829,589	170,630	1,298,018	23,791	229,639		
1941.....	115,608	931,554	260,023	1,702,786	34,632	360,809		
1942.....	131,258	1,079,692	303,714	1,994,891	29,868	310,824		
Total.....	922,912	7,840,532			551,659	5,128,105	2,084	33,623

* From 1891 to 1927 figures show sulphur content of pyrites shipped. Since 1927 figures include sulphur in pyrites shipped plus sulphur recovered from smelter gases. 1886 to 1890 inclusive tonnage of pyrites shipped.

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Continued

Year	Clay Products	Cement		Lime		Sand and Gravel	
	\$	Brls.	\$	tons	\$	tons	\$
1886	1,126,057				283,755	124,865	24,226
1887	1,398,907	69,843	81,909		394,859	180,890	30,307
1888	1,494,673	50,668	35,593		339,951	260,929	38,398
1889	1,652,334	90,474	69,790		362,846	283,044	52,647
1890	2,041,101	102,216	92,405		412,308	342,158	65,518
1891	1,802,932	93,479	108,561		251,215	243,724	59,501
1892	2,177,968	117,408	147,663		412,308	297,878	85,329
1893	2,619,590	158,597	194,015		412,308	329,116	121,795
1894	2,560,236	108,142	144,637		900,000	324,656	86,940
1895	2,487,248	128,294	173,675		900,000	277,162	118,359
1896	2,227,962	149,090	201,651		700,000	224,769	80,110
1897	2,325,903	205,213	275,273		650,000	152,963	76,729
1898	2,690,974	250,209	397,580		650,000	165,954	90,498
1899	2,988,099	396,753	633,291		800,000	242,450	101,640
1900	3,195,105	417,552	662,910		800,000	197,558	101,666
1901	3,382,706	450,394	660,030		830,000	197,302	117,465
1902	3,625,489	722,525	1,127,550		892,000	159,793	119,120
1903	4,034,289	719,993	1,225,247		900,000	355,792	124,006
1904	3,841,560	967,172	1,338,239		780,000	399,809	189,803
1905	4,709,842	1,360,732	1,924,014		750,000	306,935	152,805
1906	5,072,635	2,128,374	3,170,859	183,064	1,009,177	336,550	139,712
1907	5,772,117	2,441,868	3,781,371	166,436	974,595	298,095	119,853
1908	6,500,702	2,666,333	3,709,954	126,051	712,947	298,584	161,387
1909	6,450,840	4,067,709	5,345,802	195,752	1,132,756	481,584	256,166
1910	7,629,956	4,753,975	6,412,215	204,685	1,137,079	624,824	407,974
1911	8,359,933	5,602,915	7,644,937	263,673	1,517,599	573,494	408,110
1912	10,575,869	7,132,732	9,106,556	296,654	1,844,849		1,512,099
1913	9,504,314	8,658,805	11,019,418	264,547	1,609,398		2,258,874
1914	6,871,957	7,172,480	9,187,924	246,000	1,360,628		2,505,310
1915	3,914,488	5,681,032	6,977,024	176,654	1,015,702		1,624,767
1916	4,120,805	5,369,560	6,547,728	192,246	1,091,463	8,156,207	1,838,320
1917	4,779,038	4,768,488	7,724,246	229,851	1,558,487	9,182,417	2,326,249
1918	4,583,489	3,591,481	7,076,503	222,738	1,876,025	11,262,282	2,367,018
1919	7,906,366	4,995,257	9,802,433	250,163	2,310,607	10,364,481	2,680,460
1920	10,664,929	6,651,980	14,798,070	329,957	3,818,553	11,530,795	4,201,067
1921	8,857,818	5,752,885	14,195,143	240,767	2,781,197	11,574,862	2,537,249
1922	11,438,456	6,943,972	15,438,481	314,054	3,165,005	11,666,374	3,502,935
1923	10,483,016	7,543,589	15,064,661	351,236	3,266,608	12,752,515	3,016,518
1924	9,215,077	7,498,624	13,398,411	319,793	3,178,541	11,603,500	3,181,083
1925	9,929,691	8,116,597	14,046,704	358,979	3,387,652	11,018,647	3,220,410
1926	10,357,323	8,707,021	13,013,283	413,901	3,781,484	17,112,798	4,941,434
1927	11,173,189	10,065,865	14,391,937	444,753	3,923,388	22,952,819	6,055,601
1928	12,381,718	11,023,928	16,739,163	508,889	4,534,568	28,102,917	5,809,431
1929	13,904,643	12,284,081	19,337,235	674,087	5,908,610	27,846,945	7,317,814
1930	10,593,578	11,032,538	17,713,067	490,802	4,038,698	28,547,511	8,344,913
1931	7,841,288	10,161,658	15,826,243	344,785	2,764,415	21,748,586	6,651,165
1932	3,650,218	4,498,721	6,930,721	320,650	2,394,537	14,469,942	4,480,596
1933	2,262,835	3,007,432	4,536,935	323,540	2,432,306	11,738,823	4,464,285
1934	2,680,410	3,783,226	5,667,946	368,113	2,745,797	14,854,159	4,035,477
1935	3,012,563	3,648,086	5,580,043	405,419	2,925,791	21,213,489	6,389,440
1936	3,471,027	4,508,718	6,908,192	468,401	3,335,970	22,124,160	6,921,399
1937	4,516,859	6,168,971	9,095,867	549,353	3,824,917	27,001,301	10,492,696
1938	4,536,084	5,519,102	8,241,350	486,922	3,542,652	32,223,882	12,002,554
1939	5,151,236	5,731,264	8,511,211	552,209	4,003,514	31,294,341	11,241,102
1940	6,344,547	7,559,648	11,775,345	716,730	5,194,555	31,375,415	11,759,245
1941	7,575,336	8,368,711	13,063,588	860,885	6,357,941	31,604,806	10,375,723
1942	7,081,723	9,126,041	14,365,237	884,830	6,530,839	26,349,907	9,005,414
Total	319,149,048	243,382,421	385,639,836		119,647,056		170,390,712

Table 9.—Historical Summary of Canada's Mineral Production—Dominion Totals—Concluded

Year	Limestone (a)		Sandstone		Granite		Marble		Slate	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1886.....		650,384			6,062	63,309	501	9,900	5,345	64,675
1887.....		581,367			21,217	142,506	242	6,224	7,357	89,000
1888.....		664,825			21,352	147,305	191	3,100	5,314	90,689
1889.....		937,000			10,197	79,624	83	980	6,955	119,160
1890.....		984,787			13,307	65,985	790	10,776	6,368	100,250
1891.....		723,004			13,637	70,056	240	1,752	5,000	65,000
1892.....		633,188			24,302	89,326	340	3,600	5,180	69,070
1893.....		1,131,006			22,521	94,393	590	5,100	7,112	90,825
1894.....		1,269,645			16,392	109,936				75,550
1895.....		1,136,603			19,238	84,838	200	2,000		58,900
1896.....		1,042,850			18,717	106,709	224	2,405		53,370
1897.....		1,037,448			10,345	61,934				42,800
1898.....		1,335,403			23,897	81,073				40,791
1899.....		1,551,886			13,418	90,542				33,406
1900.....		1,564,582				80,000				12,100
1901.....		1,834,737				155,000			715	9,980
1902.....		2,127,055				210,000				19,200
1903.....		2,230,939				200,000			5,510	22,040
1904.....		2,114,315				150,000			5,277	23,247
1905.....		2,072,758				226,305				21,568
1906.....		2,084,056				278,419				24,446
1907.....		1,832,550			151,136	194,712			4,335	20,056
1908.....		1,681,293				282,320		125,000	2,950	13,496
1909.....		2,139,691		374,179		454,824		158,441	4,000	19,000
1910.....		2,249,676		502,148		739,516		158,779	3,959	18,492
1911.....		2,594,926		451,183		1,119,865		162,783	1,833	8,248
1912.....		2,762,936		329,352		1,373,119		260,764	1,894	8,939
1913.....		3,204,091		396,782		1,653,791		249,975	1,432	6,444
1914.....		2,672,781		487,140		2,176,602		312,533	1,075	4,837
1915.....		2,312,081		249,336		1,525,553		158,027	397	2,039
1916.....		2,224,091		146,244		1,247,267		118,810	1,262	6,223
1917.....		2,283,659		261,256		639,412		55,820	1,422	7,789
1918.....		2,342,403		102,750		590,871		55,550	933	5,124
1919.....		3,074,815		86,577		850,563		213,982	1,632	10,853
1920.....		5,665,693		165,149		1,508,916		240,593		14,200
1921.....	3,322,024	5,155,046	28,426	78,036	319,398	937,894	1,650	172,720		22,325
1922.....	3,152,124	4,175,941	25,221	80,908	457,925	1,486,250	1,912	231,894	1,899	14,871
1923.....	3,687,663	4,475,921	22,766	66,547	398,432	1,159,303	2,473	201,518	1,836	17,289
1924.....	4,249,061	4,831,684	94,603	240,273	419,971	1,013,345	4,379	322,455		
1925.....	4,643,853	5,049,563	87,502	145,757	971,718	2,014,535	3,046	254,922		
1926.....	5,283,745	5,657,328	44,127	112,347	1,064,423	1,574,627	5,295	521,572		
1927.....	6,438,379	7,145,917	132,799	232,793	730,009	1,383,557	5,209	503,037		
1928.....	6,949,420	7,267,437	100,951	223,236	1,195,810	2,366,946	7,753	414,682		
1929.....	7,720,840	8,172,681	159,407	398,974	1,728,165	3,080,815	14,012	414,062		
1930.....	7,732,675	8,075,616	384,610	769,060	1,851,132	3,379,951	26,089	809,582	150	3,000
1931.....	6,262,430	6,305,538	924,101	1,332,883	1,190,887	2,763,050	20,442	668,713	250	5,000
1932.....	3,687,241	3,227,715	500,480	349,458	490,822	1,110,582	12,379	250,706	250	3,750
1933.....	2,572,911	2,142,516	99,043	108,562	256,723	679,585	10,897	65,913	250	3,750
1934.....	3,747,779	3,157,832	115,169	143,283	200,285	781,739	13,783	69,475	738	4,802
1935.....	3,631,665	3,253,573	342,824	838,005	326,354	1,126,287	15,975	85,369	1,129	4,329
1936.....	3,731,548	3,143,872	285,508	495,856	941,743	1,319,313	22,866	169,698	1,247	5,414
1937.....	5,542,806	4,673,942	235,165	343,871	1,135,099	1,827,433	21,642	88,595	900	5,519
1938.....	4,288,507	3,884,619	101,854	218,405	705,307	1,379,417	19,375	87,274	979	6,311
1939.....	4,149,589	3,817,551	176,265	331,830	1,102,395	2,119,501	14,124	200,054	1,149	6,760
1940.....	6,108,591	5,126,075	176,475	305,543	1,147,747	1,884,410	13,739	75,409	1,113	7,522
1941.....	7,151,049	6,057,727	169,885	305,528	600,922	1,498,786	17,649	126,081	1,296	12,562
1942.....	6,442,583	6,468,525	153,865	226,810	1,366,425	1,946,249	13,824	88,209	1,369	16,801
Total.....		*144,773,362		*10,900,061		53,778,166		7,903,834		1,411,812

* Total value from 1909 to 1942.

(a) Exclusive of limestone used in making cement and lime.

Table 10.—Total (Cumulative) Recorded Production in Canada of Specified Metals and Minerals to December 31, 1942

		Quantity	Value
			\$
Gold.....	(a) fine ounces	85,723,542	2,431,280,820
Silver.....	(b) fine ounces	849,948,250	480,857,059
Copper.....	(c) pounds	8,600,120,793	1,004,753,176
Nickel.....	(d) pounds	3,619,405,648	995,912,410
Lead.....	(b) pounds	7,818,280,620	338,057,085
Zinc.....	(f) .....	.....	232,418,202
Cobalt.....	(e) pounds	34,205,142	33,501,404
Platinum metals.....	(g) fine ounces	2,811,548	.....
Coal.....	(h) tons	651,463,000	1,968,406,583
Asbestos.....	(i) tons	8,192,478	314,769,497

NOTE.—The total value of production by the entire Canadian mining industry from 1886 to the end of 1942 totalled \$9,751,982,266.

(a) Since 1858; (b) since 1887; (c) since 1886; (d) since 1889; (e) since 1904; (f) since 1898; (g) since 1920. Production data prior to 1920 were not included owing to some doubt existing as to origin of certain metals recovered in United States plants (h) since 1785 (i) since 1880.

Table 11.—Values of the Mineral Production of Canada, by Provinces, since 1932

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba
	\$	\$	\$	\$	\$
1932.....	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365
1933.....	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951
1934.....	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934
1935.....	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417
1936.....	26,672,278	2,587,791	49,736,919	184,532,892	11,315,527
1937.....	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645
1938.....	26,253,645	3,802,565	68,965,594	219,801,994	17,173,002
1939.....	30,746,200	3,949,433	77,335,998	232,519,948	17,137,930
1940.....	33,318,587	3,435,916	86,313,491	261,483,349	17,828,522
1941.....	32,569,867	3,690,375	99,651,044	267,435,727	16,689,867
1942.....	32,783,165	3,609,158	104,300,010	259,114,946	14,345,046

Year	Saskatchewan	Alberta	British Columbia	Yukon	Northwest Territories (*)
	\$	\$	\$	\$	\$
1932.....	1,681,728	21,174,061	27,326,173	1,993,195	21,423
1933.....	2,477,425	19,702,953	30,794,504	2,041,223	279,729
1934.....	2,977,061	20,228,851	41,206,965	1,628,879	199,604
1935.....	3,816,943	22,289,681	48,692,050	1,302,308	541,638
1936.....	6,970,397	23,305,726	54,407,036	2,220,372	775,334
1937.....	10,271,463	25,597,117	73,555,798	3,784,528	994,518
1938.....	7,782,847	28,966,272	64,549,130	3,959,570	1,614,076
1939.....	8,794,090	30,691,617	65,216,745	4,961,321	3,248,777
1940.....	11,505,858	35,092,337	74,134,485	4,118,333	2,594,157
1941.....	15,020,555	41,364,385	76,841,180	3,117,992	3,860,298
1942.....	20,578,749	47,359,831	77,247,932	3,453,568	3,976,267

* Values of pitchblende products not included in 1942.

Table 12.—Historical Summary of the Mineral Production of Nova Scotia

—	Antimony		Arsenic		Barite		Clay products	Coal	
	pounds	\$	pounds	\$	tons	\$	\$	tons	\$
1866.....								(c) 2,649,416	4,139,714
1867.....								596,332	931,769
1868.....								574,106	897,041
1869.....								647,727	1,012,074
1870.....								719,211	1,123,767
1871.....								754,827	1,179,417
1872.....								1,003,806	1,568,446
1873.....								1,108,245	1,731,632
1874.....								972,954	1,520,240
1875.....								930,613	1,454,084
1876.....								837,755	1,308,991
1877.....								880,215	1,375,339
1878.....								875,994	1,368,741
1879.....								866,220	1,353,469
1880.....								1,177,669	1,840,108
1881.....								1,280,050	2,000,079
1882.....								1,524,947	2,382,730
1883.....								1,578,609	2,466,576
1884.....								1,543,829	2,412,233
1885.....								1,547,990	2,418,735
1886.....							50,630	1,698,018	2,653,152
1887.....							43,746	1,858,596	2,904,057
1888.....							56,995	1,942,231	3,034,735
1889.....								60,520	1,918,827
1890.....							54,755	2,181,033	3,407,864
1891.....							93,611	2,267,919	3,543,624
1892.....							*	2,159,389	3,374,046
1893.....							*	2,444,924	3,820,194
1894.....							*	2,527,982	3,949,970
1895.....							*	2,225,145	3,476,790
1896.....					145	715	*	2,508,579	3,919,655
1897.....					571	3,060	*	2,493,554	3,896,179
1898.....							†173,280	2,563,180	4,004,970
1899.....							†110,695	3,148,822	5,622,898
1900.....							†108,210	3,623,536	8,088,250
1901.....					653	3,842	†103,695	4,158,068	6,496,982
1902.....					1,096	3,957	†152,025	5,161,316	9,216,636
1903.....					1,163	3,931	†150,100	5,653,338	10,095,246
1904.....					1,382	3,702	†157,762	5,596,241	9,993,288
1905.....					3,360	7,500	190,146	5,646,583	10,083,184
1906.....					4,000	12,000	160,506	6,220,505	11,108,044
1907.....					1,344	3,000	125,560	6,354,133	12,764,999
1908.....					4,312	19,021	117,833	6,652,539	13,364,476
1909.....					179	1,120	188,185	5,652,089	11,354,643
1910.....							204,782	6,431,142	12,919,705
1911.....					50	400	274,249	7,004,420	14,071,379
1912.....					464	5,104	272,053	7,783,888	17,374,750
1913.....					641	6,410	332,272	7,980,073	17,812,663
1914.....					612	6,169	266,204	7,370,924	16,452,955
1915.....	(b) 2,576,000	77,300			550	6,875	221,881	7,463,370	16,659,308
1916.....					1,368	19,393	238,470	6,912,140	18,514,662
1917.....					3,490	54,027	331,542	6,327,091	19,410,737
1918.....					580	9,145	303,515	5,818,562	21,095,470
1919.....					468	8,154	432,900	5,720,373	22,078,726
1920.....					751	22,983	541,114	6,429,291	32,238,129
1921.....					270	9,567	361,761	5,734,928	27,782,050
1922.....					289	9,537	431,618	5,569,072	24,629,921
1923.....			45,000	2,250	209	4,368	413,974	6,597,838	28,170,458
1924.....			381,092	15,244	151	3,308	†359,288	5,557,441	22,280,554
1925.....					95	2,259	†425,710	3,842,978	15,826,680
1926.....					100	2,307	362,667	6,747,477	26,845,226
1927.....			35,000	700	56	1,268	416,417	7,071,876	27,194,671
1928.....					127	2,847	496,577	6,743,504	27,427,556
1929.....					105	2,341	653,157	7,056,133	28,071,956
1930.....					66	1,484	495,333	6,252,552	24,528,860
1931.....					16	363	467,126	4,955,563	19,016,720
1932.....							172,557	4,084,581	15,167,793
1933.....							125,500	4,557,590	15,969,793
1934.....							157,158	6,341,625	21,860,093
1935.....							270,478	5,822,075	20,391,227
1936.....							355,254	6,649,102	22,973,281
1937.....	(a) 48,163	7,394					406,846	7,256,954	25,640,819
1938.....	(a) 24,560	2,200					340,253	6,236,417	22,523,802
1939.....	(a) 1,200	148					339,952	7,051,176	25,611,271
1940.....					25	162	490,543	7,848,921	28,766,195
1941.....					6,561	72,468	529,435	7,387,762	28,446,204
1942.....					17,750	172,060	618,441	7,204,852	29,116,118
Total.....		87,042	461,092	18,194	52,999	484,847	14,107,281	320,538,753	924,526,966

* No production recorded, or production not available by provinces.

(a) Metal content of ore.

(b) Ore.

(c) From 1785 to 1866.

Table 12.—Historical Summary of the Mineral Production of Nova Scotia—Continued

—	Copper		Diatomite		Gold		Grindstones		Gypsum	
	pounds	\$	tons	\$	fine oz.	\$	tons	\$	tons	\$
1861.....					*	*				
1862.....					6,863	141,871				
1863.....					13,180	272,448				
1864.....					18,883	390,349				
1865.....					24,011	496,357				
1866.....					23,776	491,491				
1867.....					25,763	532,563				
1868.....					19,377	400,555				
1869.....					16,855	348,427				
1870.....					18,740	387,392				
1871.....					18,139	374,972				
1872.....					12,352	255,349				
1873.....					11,180	231,122				
1874.....					8,623	178,244			(a) 67,830	68,164
1875.....					10,576	218,629			86,065	86,193
1876.....					11,300	233,585			87,720	87,590
1877.....					15,925	329,205			106,950	93,867
1878.....					11,864	245,253			88,631	76,695
1879.....					12,980	268,328			95,623	71,353
1880.....					12,472	257,823			125,685	111,833
1881.....					10,147	209,755			110,303	100,284
1882.....					13,307	275,090			133,426	121,070
1883.....					14,571	301,207			145,448	132,834
1884.....					15,168	313,554			107,653	100,446
1885.....					20,945	432,971			81,887	77,898
1886.....					22,038	455,564	1,765	24,050	123,753	118,110
1887.....					20,009	413,631	1,710	25,020	116,346	116,346
1888.....					21,137	436,939	1,971	20,400	124,818	120,429
1889.....					24,673	510,029	712	7,128	165,025	142,850
1890.....					22,978	474,990	850	8,536	181,285	154,972
1891.....					21,841	451,503	1,980	19,800	161,934	153,955
1892.....					18,865	389,965	2,462	27,610	197,019	170,021
1893.....					18,436	381,095	2,112	21,000	152,754	144,111
1894.....					18,834	389,338	2,128	16,000	168,300	147,644
1895.....					21,919	453,119	1,400	14,000	156,809	133,929
1896.....			644	9,960	23,876	493,568	1,450	14,500	136,590	111,251
1897.....			15	150	27,195	562,165	1,407	17,500	155,872	121,754
1898.....			1,017	16,660	26,054	538,590	1,422	12,350	132,086	106,610
1899.....			1,000	15,000	29,876	617,604	1,378	10,300	126,754	102,055
1900.....			336	1,950	28,955	598,553	1,411	12,600	138,712	108,828
1901.....			850	15,300	26,459	546,963	358	3,200	170,100	136,947
1902.....			1,052	16,470	30,348	627,357	1,074	8,118	206,087	181,425
1903.....			835	16,700	25,533	527,806	1,337	9,562	189,427	173,881
1904.....			320	6,400	10,362	214,209	1,029	7,332	118,580	153,600
1905.....			300	3,600	13,707	283,353	1,020	10,200	272,252	298,248
1906.....					12,223	252,676	1,023	9,680	333,312	345,414
1907.....			30	225	13,675	282,686	551	4,480	357,411	380,859
1908.....			30	195	11,842	244,799	473	4,803	234,455	230,433
1909.....					10,193	210,711	312	3,204	345,682	364,379
1910.....			22	134	7,928	163,891	3,586	43,700	400,455	458,638
1911.....			20	122	7,781	160,854	380	3,382	353,999	406,457
1912.....			38	230	4,385	90,638	374	3,760	376,082	481,493
1913.....			620	12,138	2,174	44,935	350	4,900	404,801	479,515
1914.....			650	13,000	2,904	60,031	350	5,270	303,155	368,931
1915.....			317	12,119	6,636	137,180	285	5,300	298,864	339,857
1916.....			620	12,139	4,562	94,305	273	5,800	238,212	278,160
1917.....			600	18,000	2,210	45,685	375	9,875	215,472	301,261
1918.....			500	12,500	1,176	24,310	256	8,000	49,365	115,976
1919.....			565	11,300	850	17,571	283	9,000	163,852	250,174
1920.....			260	8,600	690	14,263	211	8,440	260,661	573,752
1921.....			341	11,268	418	8,641	183	6,990	260,831	511,883
1922.....			219	5,781	1,128	21,598	102	3,692	332,404	580,148
1923.....			130	3,250	680	13,556	256	7,906	341,705	747,934
1924.....			33	832	1,047	21,643	338	12,525	441,752	915,845
1925.....					1,626	33,612	439	16,723	551,230	1,070,408
1926.....					1,678	34,687	311	15,136	678,107	1,187,918
1927.....			266	6,650	3,151	65,137	11	220	829,438	1,512,015
1928.....			208	4,180	1,290	26,667			1,013,257	1,850,243
1929.....			254	5,080	2,687	55,545	6	110	948,895	1,152,160
1930.....			398	7,960	1,272	26,295	6	110	827,063	982,287
1931.....			1,484	29,679	460	9,920			707,817	878,487
1932.....			1,438	28,760	964	22,634	12	433	341,508	398,861
1933.....			1,747	34,940	1,382	39,525	21	868	315,948	363,528
1934.....			1,320	52,800	3,525	121,613	50	1,762	378,287	488,044
1935.....			666	26,660	9,376	329,942	50	2,006	454,703	523,216
1936.....	779,307	73,855	565	11,300	11,960	418,959	70	2,242	729,019	808,294
1937.....	180,609	23,620	481	15,392	19,918	696,931	37	4,415	926,796	978,288
1938.....			384	13,480	26,560	934,248	131	7,006	870,586	908,383
1939.....	1,269,179	128,086	279	9,661	29,943	1,082,170	152	5,616	1,298,618	1,340,830
1940.....			241	7,786	22,219	855,432	53	2,378	1,278,204	1,302,347
1941.....			239	7,310	19,170	738,045			1,395,172	1,517,297
1942.....			218	6,541	12,989	500,076			394,216	512,762
Total.....	2,229,095	225,561	21,552	492,188	1,082,764	24,854,292	40,286	508,938	24,129,028	29,931,670

* No production recorded, or data not available by provinces.

(a) 1874-1885 inclusive—exports.

NOTE.—In 1921 there were produced 16 tons of feldspar, valued at \$117. In 1940 there were produced 17 tons of fluorspar valued at \$365; in 1941 there were 300 tons at \$3,900 and in 1942, 300 tons at \$6,584.

Table 12.—Historical Summary of the Mineral Production of Nova Scotia—Continued

	Iron Ore		Lime		Manganese Ore and Bog Manganese		Quartz	
	tons	\$	bushels	\$	tons	\$	tons	\$
1876.....	15,274							
1877.....	16,879				97			
1878.....	36,600				127	5,505		
1879.....	29,889				145	7,170		
1880.....	51,193				223	7,931		
1881.....	39,843				231			
1882.....	42,135				205			
1883.....	52,410				150	12,462		
1884.....	54,885				302½			
1885.....	48,129				353½			
1886.....	44,388		16,000	3,800	427			
1887.....	43,532		49,400	11,442	306	21,260		
1888.....	42,611		29,450	6,480	106	6,460		
1889.....	54,161				67	3,947		
1890.....	49,206		217,944	44,565				
1891.....	53,649							
1892.....	78,258							
1893.....	102,201							
1894.....	89,379							
1895.....	83,792				108	6,348		
1896.....	58,810				123½	3,975		
1897.....	23,400				15½	1,166		
1898.....	19,079				11	325		
1899.....	28,000				67	2,328		
1900.....	18,940							
1901.....	18,619							
1902.....	16,172							
1903.....	40,335							
1904.....	61,293							
1905.....	84,952							
1906.....	97,820	151,386	50,000	13,600				
1907.....	89,839	137,161	45,000	16,000				
1908.....	11,802	17,620	51,068	16,102				
1909.....			57,730	16,729				
1910.....	18,134	51,330	55,750	13,490				
1911.....	22	50	639,200	130,555	5½	300		
1912.....	30,857	168,877	709,596	145,121	75	1,875		
1913.....	20,436	21,049	854,812	171,339				
1914.....			517,722	103,748	28	1,120		
1915.....			915,086	183,017	51	5,760		
1916.....			911,534	182,506	646	70,371		
1917.....			986,106	197,344	158	14,836		
1918.....	130		748,314	149,663				
1919.....			366,543	73,309	45	3,600		
1920.....			201,500	40,300	62	4,140		
1921.....			25,914	6,085	68	3,400		
1922.....					73	2,044		
1923.....			42,370	7,199	200	1,400		
1924.....			2,229	936				
1925.....			8,243	3,464			1,352	6,760
1926.....			453,797	59,777			8,333	29,013
1927.....			873,200	100,254			4,834	16,721
1928.....			1,032,971	175,876			7,424	28,022
1929.....			1,200,029	154,187			11,845	31,388
1930.....			888,971	113,250	4	60	8,057	18,494
1931.....			526,571	79,418	60	2,400	3,116	6,836
1932.....			186,657	35,534				
1933.....			111,829	30,160			1,017	1,447
1934.....			251,857	67,954			7,292	12,107
1935.....			323,743	82,698			9,640	13,978
1936.....			447,543	119,230			6,764	10,819
1937.....			505,343	150,115			11,732	14,078
1938.....			352,886	110,648			4,701	8,415
1939.....			422,814	129,511	4	88	10,547	13,927
1940.....			628,971	184,094	152	4,315	8,755	15,670
1941.....			598,814	199,577			11,477	24,100
1942.....			624,286	226,334	61	91	10,708	23,557
Total.....							127,594	280,337

Nova Scotia had a production of lead in 1936 which amounted to 1,901,712 pounds valued at \$74,414 and in 1937 there were produced 418,086 pounds valued at \$21,364 and in 1939, 2,545,122 pounds valued at \$80,655.

In 1917 and 1918 there was a small production of molybdenite—some 274 pounds worth \$301.

Table 12.—Historical Summary of the Mineral Production of Nova Scotia—Continued

	Salt		Sand and Gravel		Silica Brick		Silver	
	tons	\$	tons	\$	M	\$	fine oz.	\$
1914.....								
1915.....			368,049	71,821				
1916.....			175,571	84,631				
1917.....			225,457	129,620				
1918.....								
1919.....	174	2,188						
1920.....	3,023	32,000						
1921.....	2,638	23,269						
1922.....	5,053	54,666	154,021	54,974				
1923.....	4,480	39,151	203,416	55,928				
1924.....	4,551	37,469	306,873	60,849			44	29
1925.....	6,598	49,889	286,614	55,362			86	59
1926.....	8,165	68,781	230,307	52,952	1,358	64,461	112	70
1927.....	14,391	102,590	812,976	522,723	1,238	50,978	125	70
1928.....	19,604	118,342	206,266	111,103	1,627	69,179	77	45
1929.....	27,819	157,662	332,599	151,368	2,385	93,207	132	70
1930.....	23,058	136,226	525,683	310,407	2,040	78,259	67	26
1931.....	27,718	143,761	403,858	198,757	621	22,044	48	14
1932.....	31,897	150,708	423,487	136,677			47	15
1933.....	34,278	161,889	282,228	126,031	453	15,834	104	39
1934.....	42,886	191,917	256,572	114,597	2,159	71,215	321	152
1935.....	38,701	161,659	1,423,557	685,973	1,968	73,218	372	241
1936.....	38,774	183,915	1,947,471	†941,366	1,922	70,570	107,642	48,576
1937.....	47,865	216,401	2,992,429	1,457,266	2,926	121,146	26,990	12,113
1938.....	44,950	194,759	2,077,378	1,013,266	1,193	49,811	988	430
1939.....	47,885	213,029	2,139,427	1,225,827	1,890	75,212	173,877	70,399
1940.....	42,495	220,328	1,440,140	867,490	2,809	120,125	725	277
1941.....	54,007	307,637	749,441	332,531	2,828	119,511	673	257
1942.....	50,199	317,798	775,795	371,970	3,090	142,511	446	188
Total.....	621,209	3,286,034			30,507	1,237,281		

† Includes production in Prince Edward Island.

Table 12.—Historical Summary of the Mineral Production of Nova Scotia—Concluded.

	Stone								Zinc		Other Products
	Granite		Limestone		Marble		Sandstone				
	tons	\$	tons	\$	tons	\$	tons	\$	pounds	\$	
1908.....					(a)	(a)					216,161
1909.....		5,832		161,922				21,850			71,715
1910.....		18,291		192,919				16,425			54,981
1911.....		24,258		245,216				23,440			68,735
1912.....		28,041		275,944				20,645			53,705
1913.....		29,302		258,719				62,490			101,196
1914.....		65,727		94,239				61,124			86,121
1915.....		79,636		255,024				33,264			
1916.....		164,870		263,803				30,625			82,527
1917.....		111,529		433,987				24,005			22,000
1918.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			119,229
1919.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			145,099
1920.....		(b)	(b)	(b)	(b)	(b)	(b)	(b)			226,121
1921.....	11,822	47,101	44,269	55,436			2,832	14,065			70,028
1922.....	12,725	44,489	68,122	56,936			7,108	18,067			10,028
1923.....	17,296	54,892	118,222	102,750			3,164	19,448			4,429
1924.....	7,554	33,021	57,069	56,323			2,912	22,480			
1925.....	14,961	54,524	84,939	73,717			2,225	6,445			
1926.....	4,884	41,738	82,753	97,255			4,678	11,799			
1927.....	611	36,770	68,294	75,292			3,546	8,745			
1928.....	39,360	102,295	72,350	79,320	160	2,975	9,298	29,185			
1929.....	76,742	98,357	175,981	199,384	132	2,515	11,851	75,966			
1930.....	7,856	38,107	79,941	88,545			64,666	193,664			
1931.....	24,895	72,009	21,684	69,415			36,602	84,208			
1932.....	3,635	18,461	9,974	27,990			21,052	40,856			
1933.....	8,145	36,675	21,514	43,911			11,790	16,043			
1934.....	325	12,300	105,620	135,962			17,123	23,055			
1935.....	525	23,800	8,988	19,188			202,952	578,844			
1936.....	66,507	99,855	20,860	36,365			167,205	239,109	6,180,219	204,874	
1937.....	16,430	50,966	24,398	35,914			137,893	192,218	5,485,550	268,902	
1938.....	5,765	31,768	20,957	34,696			36,940	80,480			
1939.....	885	20,809	17,239	33,941			31,711	79,167	9,152,856	280,901	
1940.....	87,975	155,458	24,160	46,717			69,316	111,469	4,755,502	162,210	
1941.....	410	30,537	46,973	69,501			66,219	169,307			
1942.....	429	41,985	185,232	645,680			43,856	76,502			
Total.....									25,574,127	916,887	

(a) Included with other products.

(b) Not shown by kinds 1918-1920. Total values for all kinds of stone for those years were: 1918, \$478,721; 1919, \$413,194 and 1920, \$420,175.

In 1918 tungsten concentrates amounting to 1,063 pounds valued at \$372 were produced in Nova Scotia. In 1940, 8,586 pounds valued at \$5,226 and in 1942, 4,300 pounds worth \$3,967.

Table 12.—Historical Summary of the Mineral Production of New Brunswick
—Continued

—	Clay Products		Coal (a)		Graphite		Grindstones (b)		Gypsum		Iron Ore	
	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	
1875									(c) 5,420	5,420		
1876									4,925	6,616		
1877									5,030	5,030		
1878									16,335	16,435		
1879									8,791	8,791		
1880									10,375	10,987		
1881									10,310	15,025		
1882									15,597	24,581		
1883									20,242	35,557		
1884									21,800	32,751		
1885									15,140	27,730		
1886	33,218			500	4,000	2,255	22,495	32,421	48,632			
1887	46,541	10,040	23,607	300	2,400	3,582	38,988	29,102	29,216			
1888	34,364	5,730	11,050	150	1,200	3,793	30,729	44,369	48,764			
1889	93,425	5,673	11,733	200	1,600	2,692	23,735	40,866	49,130			
1890	70,430	7,110	13,850	150	1,200	4,034	33,804	39,024	30,986			
1891	47,071	5,422	11,030	260	1,560	2,499	22,787	36,011	33,996			
1892	52,853	6,768	9,375			2,321	23,577	39,709	65,707			
1893		6,200	9,837			2,488	17,379	36,916	41,846			
1894		6,469	10,264			1,629	16,717	52,962	48,200			
1895		9,500	14,250	150	900	2,075	17,932	66,949	63,539			
1896		7,500	11,250	45	315	2,263	18,810	67,137	59,024			
1897		6,000	9,000	89	890	3,165	24,840	82,658	118,116			
1898	113,400	6,160	9,240	260	2,600	3,513	32,425	86,083	121,704			
1899	85,600	10,528	15,792			3,133	32,965	116,792	151,296			
1900	80,920	10,000	15,000	120	1,440	4,128	40,850	112,294	145,850			
1901	50,229	17,630	51,857	240	2,880	4,223	42,490	121,595	189,709			
1902	150,945	18,795	39,680	200	2,400	3,559	36,000	124,041	170,153			
1903	150,675	16,000	40,000			4,201	38,740	119,182	172,080			
1904	150,830	9,112	18,224	60	480	3,620	35,450	120,991	187,524			
1905	45,010	29,400	58,800	60	480	4,520	52,175	163,553	232,586			
1906	49,220	34,076	68,152			4,340	50,134	131,246	250,960			
1907	57,377	34,584	77,814			4,863	55,896	118,106	213,638			
1908	75,513	60,000	135,000	40	360	3,370	43,325	81,620	191,312			
1909	65,570	49,029	98,496			3,963	51,460	98,716	226,975			
1910	56,475	55,455	110,910			3,586	43,700	90,236	213,579	5,336	11,910	
1911	38,000	55,781	111,562			4,186	49,560	93,205	115,044	31,120	69,464	
1912	54,910	44,780	89,560			4,038	48,330	82,757	185,821	71,520	127,716	
1913	62,269	70,311	166,637			4,487	46,425	103,954	279,395	86,416	153,820	
1914	66,502	98,049	241,075			3,626	49,234	79,083	200,680	4,775	10,841	
1915	35,780	127,391	309,612			2,295	30,468	74,501	184,929	3,683	8,261	
1916	42,881	143,540	386,016			3,205	46,982	39,546	153,064			
1917	51,304	189,095	708,010			2,148	35,879	38,556	191,631			
1918	39,055	268,212	1,331,710			2,816	75,005	27,225	214,114			
1919	52,941	166,377	735,386			1,737	51,516	42,409	315,656			
1920	73,484	171,610	1,091,440			2,233	79,696	49,505	428,183			
1921	66,600	187,192	920,666			1,098	57,077	54,030	360,220			
1922	75,425	287,513	1,107,643			903	40,050	82,462	517,668			
1923	62,587	276,617	1,196,772			1,758	72,177	104,740	564,680			
1924	74,994	217,121	932,185			2,113	99,299	86,738	476,804			
1925	69,473	208,012	815,367			1,642	79,661	71,745	408,917			
1926	75,851	173,111	710,245			1,684	90,975	59,546	468,411			
1927	87,185	203,950	885,038			1,860	97,197	85,293	524,550			
1928	72,192	207,738	869,104			1,609	80,451	75,033	501,252			
1929	160,006	218,706	909,169			1,731	103,514	70,482	485,982			
1930	162,536	209,349	864,118			495	35,689	82,674	513,677			
1931	143,348	182,181	743,196			299	12,308	58,957	451,264			
1932	68,151	212,695	794,168			256	11,802	38,019	297,520			
1933	46,917	312,303	1,041,744			277	12,051	30,391	88,500			
1934	59,897	314,750	1,026,343			535	27,091	30,398	104,709			
1935	62,478	346,024	1,129,019			456	21,175	30,796	105,960			
1936	102,526	368,618	1,190,032			412	17,982	38,470	123,560			
1937	123,876	364,714	1,180,611			288	12,139	36,906	131,727			
1938	123,625	342,238	1,133,346			175	9,192	48,418	159,203			
1939	129,985	468,421	1,566,359			152	9,662	29,765	134,286			
1940	171,745	547,064	1,963,012			255	12,000	52,218	192,980			
1941	193,643	523,344	2,021,394			188	11,500	56,172	150,530			
1942	246,041	435,203	1,826,043			216	10,000	36,623	111,316			
Total.....		8,369,191	30,871,153	2,824	24,705	133,488	2,283,490	4,077,161	12,435,978	202,850	382,012	

(a) For the years 1919-1942 the tonnage shown is the total output from all mines. For previous years the figures given include only sales, colliery consumption and coal used by the operators.

(b) Includes pulpstones, etc.

(c) From 1875 to 1885, inclusive, the figures shown are exports.

Table 12.—Historical Summary of the Mineral Production of New Brunswick
—Continued

—	Lime		Manganese Ore		Manganese Bog		Mineral Waters	Natural Gas		Petroleum	
	bushels	\$	tons	\$	tons	\$	\$	M cu. ft.	\$	barrels	\$
1886.....	316,380	58,120									
1887.....	478,410	103,463									
1888.....	440,225	82,993									
1889.....	1,005,685	162,157									
1890.....	814,662	136,586									
1891.....	67,430	15,285									
1892.....	(a)	(a)									
1893.....											
1894.....											
1895.....											
1896.....											
1897.....											
1898.....											
1899.....											
1900.....											
1901.....											
1902.....											
1903.....											
1904.....											
1905.....											
1906.....	405,450	94,290									
1907.....	554,330	124,786									
1908.....	155,748	34,262					14,894				
1909.....	697,466	154,151					14,003				
1910.....	470,050	105,593					16,000			1,485	1,828
1911.....	613,728	132,897					19,843			2,461	3,019
1912.....	616,835	133,742						173,903	36,549	2,679	3,799
1913.....	392,985	98,841						828,603	174,147	2,111	3,762
1914.....	391,739	102,980						425,826	54,249	1,725	2,742
1915.....	369,117	93,797	150	3,600				430,692	60,383	1,020	1,423
1916.....	424,113	104,635	(b)	(b)				610,118	79,628	1,345	2,663
1917.....	532,251	171,248						796,775	103,735	2,341	5,460
1918.....	482,548	221,935						792,396	107,842	3,009	7,402
1919.....	468,533	223,193						682,890	120,510	4,225	13,141
1920.....	701,859	365,030						682,502	130,506	5,148	19,963
1921.....	562,447	203,084						708,743	139,375	7,479	33,022
1922.....	500,834	187,895						753,898	148,040	7,778	32,732
1923.....	329,548	143,814						640,300	126,068	8,826	35,642
1924.....	208,180	108,890	584	4,088				599,972	113,577	5,561	21,313
1925.....	202,106	92,216						639,235	122,394	5,376	18,756
1926.....	477,226	196,477						643,316	128,300	10,544	29,940
1927.....	343,111	148,321						630,755	124,637	18,244	41,748
1928.....	321,743	130,754			335	2,237		660,981	324,344	8,043	21,391
1929.....	443,371	174,553			300	1,800		678,456	333,002	7,499	19,909
1930.....	357,743	135,304			275	1,650		661,975	325,751	6,758	17,378
1931.....	321,171	127,054	269	1,296	77	462		655,891	323,184	6,577	15,461
1932.....	330,629	109,184	57	493				662,452	326,191	6,408	14,332
1933.....	481,400	134,786						618,033	302,706	8,835	18,111
1934.....	450,057	126,409						623,601	306,005	11,106	22,277
1935.....	464,914	124,775	100	800				615,454	303,886	12,954	18,230
1936.....	509,771	128,016	221	1,596				606,246	298,819	17,112	24,075
1937.....	568,542	150,362	85	817				576,671	283,922	18,089	25,496
1938.....	435,629	119,556						577,492	284,689	19,276	27,246
1939.....	533,571	151,898	392	3,600				606,382	292,403	22,799	32,082
1940.....	606,743	175,407						616,041	300,543	22,167	31,220
1941.....	621,486	180,133						653,542	317,437	31,359	44,102
1942.....	640,771	197,481	374	8,841				619,380	299,688	28,089	39,467
Total.....								19,477,521	6,392,510	318,423	649,130

(a) No record 1892-1905.

(b) Included with other products.

Table 12.—Historical Summary of the Mineral Production of New Brunswick
—Concluded

—	Sand and Gravel		Granite		Limestone		Marble		Sandstone		Other Products
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	\$
1908.....							(b)	(b)			85,510
1909.....				11,541		30				30,609	4,200
1910.....				6,880		315				51,793	
1911.....				37,994		110				35,537	
1912.....				22,317						68,260	
1913.....				32,945						70,787	22,868
1914.....				24,525						236,647	25,095
1915.....	323,192	19,014		8,335						145,177	
1916.....	803,014	120,988		59,325		6,900				46,032	69,073
1917.....	518,401	47,062		61,170		22,875				27,105	
1918.....			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	39,217
1919.....			(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	73,933
1920.....	(b)	(b)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	59,472
1921.....	239,192	24,171	14,325	92,790					800	4,500	
1922.....	448,322	49,509	11,389	95,352					638	9,378	
1923.....	608,528	94,634	11,509	143,473	10,689	21,981			250	629	
1924.....	141,897	23,999	4,921	80,812	14,308	33,299					
1925.....	70,156	12,331	9,027	89,731	16,364	35,012					
1926.....	70,931	11,360	3,824	66,423	15,054	30,722			230	2,400	
1927.....	388,066	118,768	1,634	53,695	25,124	56,146			3,150	11,250	
1928.....	491,471	54,183	5,485	66,435	30,772	57,650			10,075	18,896	
1929.....	525,857	46,167	5,142	91,610	20,710	33,360			1,500	80,000	
1930.....	357,551	41,303	46,209	139,212	40,262	97,841			25,141	47,816	
1931.....	183,475	18,149	2,583	148,881	35,378	73,398			24,364	119,712	
1932.....	569,150	447,239	4,369	102,699	10,707	31,554			1,729	20,665	
1933.....	496,961	331,497	1,792	82,771	14,262	41,904			660	6,695	
1934.....	568,064	322,238	5,984	76,793	30,356	78,441			1,578	5,948	
1935.....	1,813,206	845,981	31,091	103,275	53,213	86,001			840	19,447	
1936.....	970,945	567,797	1,485	73,784	53,781	55,564			4,165	4,410	
1937.....	1,136,013	715,652	936	74,961	51,929	55,600			4,603	8,480	
1938.....	3,833,540	1,825,383	954	71,600	7,985	19,855			4,340	28,870	
1939.....	3,373,303	1,363,051	1,492	72,005	52,505	142,927			21,412	51,175	
1940.....	944,033	278,710	1,326	69,833	159,812	206,916			5,015	33,550	
1941.....	962,483	423,772	1,529	63,184	131,941	274,000			4,678	10,680	
1942.....	923,020	540,541	964	29,334	82,623	281,296			4,350	10,650	

(a) Not recorded by kinds.—Total stone production in 1918 was \$99,044, in 1919 it was 125,294 and in 1920 it was \$280,167.

(b) Included with other products.

NOTE.—In addition to the above items 13,440 pounds of antimony valued at \$2,688 were produced in 1915. In 1917 there were 33,920 pounds of copper valued at \$9,219 and 400 ounces of silver valued at \$326 produced. Also in 1918 tungsten concentrates amounting to 22,000 pounds valued at \$8,693 were produced.

Table 12.—Historical Summary of the Mineral Production of Quebec

Year	Aluminium	Asbestos (b)		Cement		Chromite		Clay Products	Copper	
	pounds	tons	\$	barrels	\$	tons	\$	\$	pounds	\$
1877.....										
1878.....										
1879.....										
1880.....		380	24,700							
1881.....		540	35,100							
1882.....		810	52,650							
1883.....		955	68,750							
1884.....		1,141	75,097							
1885.....		2,440	142,441							
1886.....		3,458	206,251			60	945	83,025	3,340,000	367,400
1887.....		4,619	226,976			38	570	80,117	2,937,900	330,514
1888.....		4,404	255,007					223,161	5,562,864	927,107
1889.....		6,113	426,554					278,845	5,315,000	730,813
1890.....		9,860	1,260,240					458,597	4,710,606	741,920
1891.....		9,279	999,878					500,957	5,401,704	695,469
1892.....		6,082	390,462					489,470	4,883,480	564,042
1893.....		6,331	310,156						4,468,352	480,348
1894.....		7,630	420,825			1,000	20,000		2,176,430	208,067
1895.....		8,756	368,175			3,177	41,300		2,242,462	241,288
1896.....		12,250	429,856			2,342	27,004		2,407,200	261,903
1897.....		30,442	445,368			2,637	32,474		2,474,970	279,424
1898.....		23,785	491,197			2,021	24,252	820,758	2,100,235	252,658
1899.....		25,536	485,489			2,010	21,842	828,868	1,632,560	287,494
1900.....		29,141	748,431			2,335	27,000	866,060	2,220,000	359,418
1901.....	283,737	40,217	1,259,759			1,274	16,744	884,166	1,527,442	246,178
1902.....	1,983,252	40,416	1,148,319			900	13,000	946,755	1,640,000	190,666
1903.....	1,750,599	41,677	929,757			3,509	51,129	1,028,246	1,152,000	152,467
1904.....	2,302,178	48,465	1,226,352			6,074	67,146	917,894	760,000	97,455
1905.....	2,590,329	68,263	1,503,259			8,575	93,301	896,000	1,621,243	252,752
1906.....	4,696,949	82,185	2,060,143			9,035	91,859	769,458	1,981,169	381,930
1907.....	5,921,299	90,426	2,505,042			7,196	72,901	1,214,108	1,517,990	303,659
1908.....	972,146	90,773	2,573,335	704,492	984,350	7,225	82,008	893,717	1,282,024	169,330
1909.....	6,083,695	87,300	2,301,775	1,011,194	1,814,550	2,470	26,604	1,153,832	1,088,212	141,272
1910.....	9,647,958	102,215	2,573,603	1,563,714	1,954,646	299	3,734	1,442,842	877,347	111,757
1911.....	9,679,980	127,414	2,943,108	1,614,730	1,963,439	157	2,587	1,341,467	2,436,190	301,503
1912.....	12,029,046	136,301	3,137,279	2,714,685	3,134,499			1,680,460	3,282,210	536,346
1913.....	14,065,028	161,086	3,849,925	2,940,211	3,430,023			1,006,816	3,455,887	527,679
1914.....	14,550,959	117,573	2,909,806	2,846,061	3,331,601	136	1,210	1,267,700	4,201,497	571,458
1915.....	18,368,524	136,842	3,574,985	2,890,724	2,812,797	12,341	179,543	918,425	4,197,482	725,115
1916.....	21,184,791	154,149	5,228,589	2,150,475	2,525,863	27,517	311,460	993,664	5,703,347	1,551,424
1917.....	22,088,067	153,771	7,225,233	2,079,625	3,274,989	36,725	409,682	983,310	5,015,560	1,363,229
1918.....	23,535,659	158,259	8,970,797	1,564,360	3,003,571	21,324	835,727	817,357	5,869,649	1,445,577
1919.....	21,582,264	159,236	10,975,369	2,200,422	4,340,010	8,541	228,898	1,577,576	2,691,695	503,105
1920.....	22,384,702	199,573	14,792,201	3,013,463	6,545,054	11,016	251,379	2,376,029	880,638	153,724
1921.....	6,335,083	92,761	4,906,230	2,135,631	5,410,275	2,798	55,696	1,744,760	352,308	44,045
1922.....	12,867,305	163,706	5,552,723	2,660,935	5,907,300	767	11,503			
1923.....	24,245,766	231,476	7,519,905	3,173,993	6,347,986	3,558	52,650	2,439,598		
1924.....	27,243,004	225,572	6,618,936	2,758,316	4,796,959			2,435,695	1,893,008	246,546
1925.....	31,105,293	290,387	8,087,459	3,365,802	5,689,991			2,426,887	2,510,141	352,474
1926.....	35,910,914	279,389	10,095,483	3,727,377	4,535,386			2,702,298	2,674,058	368,886
1927.....	82,735,938	274,773	10,621,013	4,636,751	5,383,058			2,734,738	3,119,848	403,084
1928.....	82,797,804	273,033	11,238,360	4,813,820	6,305,396			3,097,295	33,697,949	4,909,791
1929.....	63,439,528	306,055	13,172,581	5,169,408	7,120,374			3,187,702	55,337,169	10,019,901
1930.....	76,217,209	242,514	8,390,163	4,865,609	7,031,523			2,464,044	50,301,363	10,425,891
1931.....	68,103,008	164,296	4,812,886	4,942,223	7,062,895			2,360,908	68,376,985	5,723,154
1932.....	39,585,847	122,977	3,039,721	2,210,584	3,155,702	78	1,113	1,064,551	67,336,692	4,296,216
1933.....	35,532,104	158,367	5,211,177	1,517,555	2,128,900	30	343	580,088	69,943,882	5,214,177
1934.....	34,865,362	155,980	4,936,326	1,613,641	2,294,847	71	1,098	632,322	73,968,545	5,487,948
1935.....	46,342,747	210,467	7,054,614	1,751,012	2,472,008	346	5,371	593,162	79,050,906	6,182,550
1936.....	50,280,250	301,287	9,958,183	2,093,130	2,945,074	545	8,508	691,765	66,340,175	6,287,058
1937.....	93,812,965	410,025	14,505,541	2,578,623	3,537,798	210	3,286	1,053,153	94,653,132	12,378,737
1938.....	142,407,743	289,793	12,890,195	2,730,320	3,693,188			1,022,194	112,645,797	11,238,039
1939.....	165,680,869	364,454	15,858,492	3,027,759	4,035,294			1,274,776	117,238,957	11,831,749
1940.....	218,288,565	346,805	15,619,865	3,854,339	5,432,105	335	5,780	1,546,246	134,166,955	13,532,079
1941.....	427,746,534	477,846	21,468,840	4,048,749	5,798,188	2,372	42,679	1,944,358	143,783,978	14,502,052
1942.....	681,192,951	439,459	22,663,283	4,446,416	6,487,078	11,456	343,568	1,741,297	140,911,876	14,212,372
1943.....	991,499,296									
Total.....		8,211,120	314,677,855			202,500	3,555,894		1,451,368,009	154,086,070

Data for cement production are not available prior to 1908. Cement was produced in Quebec as early as 1840.
 (b) 1880 to 1886—exports.

Table 12.—Historical Summary of the Mineral Production of Quebec—Continued

—	Feldspar		Gold		Graphite		Iron Ore†		Iron Oxides Ochre	
	tons	\$	fine oz.	\$	tons	\$	tons	\$	tons	\$
1876.....										
1877.....			583	12,057						
1878.....			868	17,937						
1879.....			1,160	23,972						
1880.....			1,605	33,174						
1881.....			2,741	56,661						
1882.....			827	17,093						
1883.....			860	17,787						
1884.....			422	8,720						
1885.....			103	2,120						
1886.....			193	3,981					350	2,350
1887.....			78	1,604			13,404		485	3,733
1888.....			181	3,740			10,710		397	7,900
1889.....			58	1,207	42	1,560	14,533		794	15,280
1890.....	700	3,500	65	1,350	25	4,000	22,305		275	5,125
1891.....	685	3,425	87	1,800			14,380		900	17,750
1892.....	175	525	628	12,987	167	3,763	22,690		390	5,800
1893.....	575	4,525	759	15,696			22,076		1,070	17,710
1894.....			1,412	29,196	5	400	19,492		611	8,690
1895.....			62	1,281	70	5,250	17,783		1,339	14,600
1896.....	972	2,583	145	3,000	94	9,140	17,630		2,362	16,045
1897.....	1,400	3,290	44	900	247	12,350	22,436		3,905	23,560
1898.....	2,500	6,250	295	6,089	100	5,098	17,873		2,226	17,450
1899.....	3,000	6,000	238	4,916	90	8,000	19,420		3,919	20,000
1900.....	155	542			302	5,600	19,000		1,966	15,398
1901.....	534	1,068	145	3,000	220	4,400	15,489		2,233	16,735
1902.....			391	8,073	100	10,000	18,524		4,955	30,495
1903.....	18	32	180	3,712			12,035		6,266	32,760
1904.....			140	2,900	25	2,300	16,152		3,925	24,995
1905.....			191	3,940			12,681		5,105	34,675
1906.....			165	3,412	125	8,300	9,933	32,938	6,758	36,125
1907.....					120	5,000	12,748	34,956	5,828	35,570
1908.....					1	165	10,103	22,094	4,746	30,440
1909.....	97	1,719	193	3,990	134	10,176	4,150	5,508	3,940	28,096
1910.....	90	1,800	124	2,565	155	16,000	4,503	8,252	4,813	33,185
1911.....	17	255	613	12,672	374	33,084	3,616	6,479	3,612	28,173
1912.....	100	2,000	642	13,270	604	50,680	1,185	4,232	7,654	32,410
1913.....	74	1,554	701	14,491	103	9,620	5,102	26,999	5,987	41,774
1914.....	98	2,156	1,292	26,708	261	18,886			5,890	51,725
1915.....	572	2,005	1,099	22,720	75	5,431			6,248	48,353
1916.....	4,610	18,075	1,034	21,375	479	75,776	3,209	8,308	8,811	58,711
1917.....	1,188	8,204	1,511	31,235	541	106,305	16,488	48,599	9,409	87,605
1918.....	191	4,279	1,939	40,083	180	40,018	6,330	28,211	17,317	112,440
1919.....	925	13,073	1,470	30,388	20	400	321	1,005	11,862	113,427
1920.....	649	10,052	955	19,742	233	31,913	960	3,000	19,128	157,909
1921.....	9,737	80,180	635	13,127	38	2,423			8,879	92,765
1922.....	12,472	127,826			24	1,500	526	1,410	7,282	110,488
1923.....	12,026	102,779	667	13,788	45	2,316	69	186	9,911	123,186
1924.....	16,147	142,118	883	18,253	46	3,275	1,408	3,771	7,146	88,540
1925.....	11,287	94,730	1,602	33,116	359	30,900	3,978	11,934	6,985	89,173
1926.....	13,168	111,136	3,680	76,072	326	29,516	200	600	6,518	100,923
1927.....	12,730	104,618	8,331	172,217	34	2,043	2,029	8,980	5,931	102,186
1928.....	12,943	104,789	60,006	1,240,434	50	4,668	2,244	6,732	5,278	109,383
1929.....	15,790	133,492	90,798	1,876,961	173	12,652	2,748	7,359	6,220	113,932
1930.....	17,074	163,802	141,747	2,930,170	197	9,850	412	1,239	6,590	83,753
1931.....	10,381	86,842	300,075	6,471,075			1,509	10,261	5,410	48,205
1932.....	3,390	39,062	401,105	9,417,572					5,017	44,161
1933.....	6,183	59,283	382,886	10,950,539	43	2,222			4,192	51,965
1934.....	9,207	78,853	390,097	13,458,347	129	6,426	2,023	14,161	4,798	64,566
1935.....	7,002	63,075	470,552	16,558,725	21	1,281	2,288	16,400	5,357	75,388
1936.....	8,115	75,703	666,905	23,361,683			2,566	18,318	5,458	65,630
1937.....	12,285	105,612	711,480	24,894,685			4,229	26,432	5,617	77,640
1938.....	5,874	62,878	881,263	30,998,426			207	1,449	5,387	67,209
1939.....	5,399	60,923	953,377	34,455,998			3,694	21,267	5,465	82,501
1940.....	8,548	89,004	1,019,175	39,238,238			5,535	24,510	9,603	107,926
1941.....	14,218	137,160	1,089,339	41,939,552			12,651	49,110	8,770	139,185
1942.....	16,802	164,588	1,092,388	42,056,938			10,218	51,841	8,866	147,049
Total.....	260,103	2,285,365	8,693,190	300,717,460	6,377	592,687	465,795		310,156	3,212,748

NOTE:—2 tons of garnets valued at \$150 were produced in 1927. * Includes a small production from Ontario.

† From 1911 shipments consisted almost entirely of titanium ores; in 1942 included 187 tons of straight iron ore valued at \$935.

Table 12.—Historical Summary of the Mineral Production of Quebec—Continued

—	Kaolin		Lead		Lime		Magnesitic Dolomite		Mica		Mineral Waters (Natural)	
	tons	\$	pounds	\$	bushels	\$	tons	\$	tons	\$	imp.gal.	\$
1886					401,700	75,700				6,991		
1887					424,316	79,137				8,276		
1888					356,646	61,489			(a)	(a)		
1890					187,220	36,831				1,496		
1890			105,000	4,704	116,593	23,274				9,590		
1891			88,665	3,857	506,700	77,462				37,000		
1892					*	*				23,000		
1893												
1894			3,931	146								
1895												
1896												
1897			177,084	6,340						26,000		
1898			221,760	8,382						106,375		
1899										133,000		
1900			11,200	490						106,000		
1901			318,052	13,784						120,000		
1902			420,000	17,090					66	34,204		
1903										74,119		
1904										76,487		
1905										109,672		
1906					923,563	201,816			283	159,334		
1907					1,053,856	262,990			318	224,197		
1908					857,700	201,357	120	840	148	82,613		75,533
1909					1,281,827	315,633	330	2,503	128	93,298		68,565
1910					1,227,555	299,126	323	2,160	316	87,295		68,194
1911					1,428,392	356,453	991	5,531	217	69,465		63,637
1912	20	160			1,727,614	474,595	1,714	9,645	196	81,044	92,873	36,736
1913	500	5,000			1,616,446	418,008	515	3,335	626	125,488		30,805
1914	1,000	10,000			1,767,935	389,064	358	2,240	246	62,794		16,566
1915	1,300	13,000	40,401	2,262	1,351,306	274,831	14,779	126,584	217	50,390		18,086
1916	1,750	17,500	698,760	59,485	1,498,845	267,119	54,778	554,304	844	192,343	93,782	16,223
1917	863	9,594	1,378,001	153,468	1,470,486	335,012	58,090	728,275	774	286,730		9,201
1918	533	19,299	2,110,059	195,180	1,527,784	418,888	39,365	1,016,765	481	229,119		7,609
1919	759	13,744	2,280,000	158,825	1,796,822	493,762	11,273	328,465	2,429	218,437		13,257
1920	683	15,022	905,472	80,949	2,108,203	826,044	18,378	512,756	737	281,460	24,219	10,109
1921	124	1,888	595,881	34,215	2,040,451	790,503	2,927	74,109	484	41,172	19,626	7,278
1922	1,197	17,866			2,259,313	689,799	2,849	76,294	1,360	97,748	12,161	3,692
1923	163	2,369	520,041	37,334	2,357,928	634,213	4,801	134,382	1,545	216,684	5,421	2,408
1924			1,058,983	85,820	2,386,445	699,937	3,873	101,356	1,677	185,020	7,683	2,288
1925			2,051,100	187,060	2,542,237	673,330	5,576	122,325	2,415	187,800	7,122	2,961
1926			3,729,636	251,788	2,849,635	766,116	4,571	137,431	1,664	170,118	6,956	2,444
1927			6,496,577	341,461	3,075,819	806,665	7,337	230,309	1,454	99,194	10,330	1,813
1928			6,218,336	284,520	3,260,857	896,782	13,195	346,990	1,101	54,224	15,415	5,608
1929			5,358,304	270,616	4,768,343	1,264,194	18,809	491,170	1,062	72,630	12,205	2,488
1930					3,695,714	967,650	13,336	336,162	430	61,729	12,941	3,727
1931					3,185,600	804,218	11,411	295,579	290	30,601	19,868	4,746
1932					2,680,371	587,901		262,860	41	4,076	15,506	4,697
1933					3,152,400	647,558		360,128	256	39,060	9,024	3,094
1934					3,105,429	631,984		382,927	322	85,967	75,665	16,116
1935			2,047,624	64,156	3,327,800	678,866		486,084	373	74,894	126,616	15,113
1936			2,047,689	80,126	3,807,257	718,585		768,742	272	63,123	131,186	17,399
1937			1,521,182	77,732	4,466,086	909,116		677,207	546	124,594	198,319	19,697
1938					3,923,257	843,331		420,261	218	72,982	159,893	19,033
1939					4,603,200	983,072		474,418	434	122,243	104,629	17,503
1940					6,669,114	1,480,466		897,016	436	202,583	109,025	18,466
1941	2	30			8,757,571	2,062,744		831,041	802	284,563	144,441	58,062
1942	408	6,130	437,634	14,713	9,959,314	2,323,707		1,059,374	1,329	285,263	129,062	60,316
Total	9,302	131,602	40,841,372	2,434,503				12,259,568				723,470

* Data are not available by provinces from 1892-1905.

(a) No record.

NOTE: One bushel of lime equals 70 pounds.

Table 12.—Historical Summary of the Mineral Production of Quebec—Continued

Year	Molybdenite		Peat		Phosphate (b)		Pyrites (Sulphur content) (c)		Quartz		Sand and Gravel	
	pounds	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1878					9,919	195,831						
1879					6,604	101,470						
1880					11,673	175,664						
1881					9,497	182,339						
1882					16,585	302,019	2,300					
1883					19,666	427,168						
1884					20,946	415,350	42,906					
1885					28,535	490,331						
1886					19,435	288,603	34,600					
1887					19,589	264,452	36,000					
1888					20,396	219,779						
1889					27,552	287,400						
1890					27,172	309,980			200	1,000		
1891					20,244	206,416						
1892					10,231	134,964						
1893					7,650	60,076			100	500		
1894					6,861	41,166						
1895					1,822	9,565						
1896					570	3,420			10	50		
1897					908	3,984						
1898					632	3,160			284	570		
1899					1,279	7,674			600	1,260		
1900					1,270	6,090						
1901					1,033	6,280						
1902					856	4,953						
1903					1,329	8,214						
1904					817	4,590						
1905					1,300	8,425						
1906					600	4,500						
1907					408	3,410						
1908					598	5,900	26,598	159,588				
1909					525	4,800	35,300	130,009				
1910			70	280	1,456	12,386	24,242	102,162	805	1,006		
1911			200	800	586	4,909	39,122	247,555	548	684		
1912			500	2,000	164	1,640	60,849	243,396	556	1,240		243,126
1913			2,000	8,000	385	3,643	87,314	349,265	1,008	2,000		638,778
1914					554	4,875	117,698	470,792	847	847		370,713
1915					200	2,400	142,735	570,940	778	778		260,983
1916					190	2,340	130,639	523,272	1,149	1,436	934,746	212,884
1917	216,693	216,693			123	1,230	122,882	501,351	550	1,788	998,600	265,282
1918	333,318	383,315			140	1,200	124,871	507,802	1,730	5,383	(a)	(a)
1919	85,002	69,203	486	4,811	22	300	52,746	203,222	2,221	7,773	(a)	(a)
1920							14,817	44,451	1,986	5,558		431,826
1921					30	450	1,986	10,463	5,994	29,824	700,669	110,752
1922					131	1,320			10,994	53,023	905,101	156,940
1923					30	600			13,376	68,936	1,055,817	206,175
1924	18,739	9,370					4,032	10,619	17,893	87,267	2,197,145	414,428
1925	22,350	11,176			16	189	12,250	36,750	6,459	30,064	2,203,196	533,850
1926	20,943	10,472			40	800	14,100	42,117	24,550	107,779	5,233,696	1,490,674
1927					31	399	13,021	42,795	49,141	132,615	8,615,738	1,880,931
1928					91	1,126	1,552	12,061	64,577	143,067	8,136,341	1,701,282
1929	16,150	6,400	1,607	8,839	40	800	9,926	73,119	46,444	132,532	6,203,231	1,534,699
1930			2,219	9,330	40	760	12,653	93,038	49,561	119,668	6,581,807	1,750,690
1931			1,170	5,937			14,586	108,617	26,987	69,759	7,657,964	1,952,959
1932			762	2,286	1,316	12,333	17,954	133,838	20,123	71,645	3,458,128	893,896
1933			681	2,549	105	805	19,167	146,261	28,294	109,533	3,356,232	942,429
1934					81	683	4,908	50,398	57,208	229,817	3,672,582	980,454
1935					116	1,043	7,370	47,779	51,948	226,839	5,268,987	1,442,468
1936			45	255	525	4,927	43,084	282,743	78,975	320,634	5,490,280	1,418,231
1937					100	900	28,534	194,496	127,535	448,327	9,476,000	2,637,495
1938					208	1,886	16,580	98,261	85,153	315,251	12,523,404	3,532,873
1939	2,240	600			157	1,712	61,476	275,951	104,827	369,172	10,050,985	2,703,032
1940	22,251	10,280			358	4,039	61,728	212,012	109,090	321,891	12,177,624	3,127,931
1941	196,600	88,470	*7,265	173,639	2,487	33,376	146,826	575,422	147,318	388,948	11,681,390	2,673,300
1942	222,276	131,906	*12,982	197,560	930	12,973	168,832	675,965	203,219	543,817	11,026,249	2,485,853
Total	1,154,562	937,885	29,987	416,286	307,154	4,304,017			1,343,038	4,352,281		

(a) Included with other products.

(b) 1878-1885 exports and include a quantity of Ontario phosphate cleared through Montreal.

(c) 1871-1899 tons of pyrites shipped; data 1890-1907 not recorded by provinces, 1908-1927 tonnage of pyrites shipped 1928-1942 sulphur content of pyrites shipped.

* Moss only.

Table 12.—Historical Summary of the Mineral Production of Quebec—Continued

[illegible]

Table 12.—Historical Summary of the Mineral Production of Quebec—Continued

Year	Selenium	Silver	Stone							
			Granite (b)		Limestone (b)		Marble (b)		Sandstone (b)	
	pounds	fine oz.	tons	\$	tons	\$	tons	\$	tons	\$
1932.....	22,131	628,902	143,520	541,680	1,622,802	1,337,688	9,832	206,502	470,671	275,022
1933.....	48,704	470,419	131,837	408,207	1,129,248	940,019	7,933	42,283	73,425	58,231
1934.....	206,421	698,836	69,438	488,477	1,034,058	853,815	9,302	47,503	86,364	85,822
1935.....	108,451	366,358	131,096	806,685	1,143,983	1,087,320	10,518	43,455	104,920	122,301
1936.....	208,551	366,789	137,912	429,283	1,265,243	1,058,547	17,866	138,294	92,228	102,388
1937.....	208,552	378,127	218,743	611,125	1,653,556	1,474,653	14,957	61,348	70,726	65,424
1938.....	23,841	1,187,495	294,446	757,531	1,550,019	1,672,260	8,838	46,580	42,587	51,010
1939.....	43,510	1,340,450	503,011	1,276,859	1,904,658	1,726,653	7,600	168,612	112,403	150,792
1940.....	43,510	1,657,082	366,662	512,709	2,287,384	1,854,423	8,767	50,652	92,378	129,179
1941.....	203,162	626,319	316,372	792,708	3,370,875	2,567,422	10,809	92,916	76,928	82,701
1942.....	326,208	626,319	1,178,765	1,449,840	2,926,964	2,565,029	9,429	58,714	72,894	92,724
Total	1,468,937	2,662,715	17,869,323	9,025,128						

(b) Data not available prior to 1908.
recorded in squares.

(c) Data not available by kinds. Total values for all grades were:—1918, \$952,402; 1919, 1,441,919, and 1920, 2,189,425.

†1903 to 1919 inclusive

Table 12.—Historical Summary of the Mineral Production of Quebec—Concluded

	Talc and Soapstone		Tellurium		Zinc (a)		Other Products
	tons	\$	pounds	\$	pounds	\$	\$
1886.....	50	400					
1887.....	100	800					
1888.....	140	280					
1889.....	195	1,170					
1890.....	917	1,229					
1891.....							
1892.....	1,374	6,240					
1893.....	717	1,920					
1894.....	916	1,640					
1895.....	475	2,138					
1896.....	410	1,230					
1897.....	157	350					
1898.....	405	1,000			788,000	36,011	
1899.....	450	1,960					
1900.....					22,400	983	
1901.....							
1902.....							
1903.....							
1904.....							
1905.....							
1906.....							
1907.....							
1908.....							959,920
1909.....							
1910.....							
1911.....							
1912.....							
1913.....					670,000	6,700	24,063
1914.....					1,938,000	10,017	5,180
1915.....					600,000	16,500	6,390
1916.....					1,663,200	212,956	129,275
1917.....					1,786,740	159,038	351
1918.....					2,802,928	228,691	182,902
1919.....					1,752,000	128,562	248,707
1920.....	150	1,050			1,120,200	85,931	
1921.....							
1922.....	150	4,950					
1923.....	590	19,993			366,240	24,197	
1924.....	449	20,273			2,909,008	184,547	
1925.....	704	30,130			9,936,000	757,322	
1926.....	885	38,209			12,904,176	956,199	
1927.....	1,276	51,504			17,189,046	1,064,690	
1928.....		40,171			21,057,760	1,156,745	
1929.....		47,986			19,653,440	1,058,731	
1930.....		50,168			9,754,160	351,150	
1931.....		34,439					
1932.....		46,751					
1933.....		47,680					
1934.....		44,297					
1935.....		32,053	1,708	3,416	5,322,844	164,955	
1936.....		32,770	19,502	34,519	6,896,123	228,606	
1937.....		40,513	26,439	45,739	8,566,927	419,951	
1938.....		35,038	41,577	71,512	5,315,852	163,356	
1939.....		41,471	2,940	4,769	28,758,759	882,606	
1940.....		74,905			27,696,721	944,735	
1941.....		155,925			46,389,581	1,582,349	*
1942.....	14,369	136,529			73,940,811	2,522,121	(b)
Total.....		1,047,172	92,166	159,955		13,347,649	1,556,788

(a) 1898-1900, pounds of zinc contained in ore or concentrates shipped from the mines; 1913-1915, pounds of ore shipped from the mines; 1916-1942, pounds of zinc recovered by Canadian smelters and estimated recoveries by foreign smelters.

* 101 tons barite valued at \$808 and 989 pounds tungsten concentrates worth \$627.

(b) Includes:—6,349,074 pounds arsenic valued at \$428,562; 141,081 pounds magnesium (produced in Ontario from Quebec brucite) valued at \$62,076 and 2,981 pounds tungsten concentrates worth \$2,612.

Table 12.—Historical Summary of the Mineral Production of Ontario

—	Actinolite		Arsenic		Asbestos		Barite		Bismuth		Cement (d)	
	tons	\$	pounds	\$	tons	\$	tons	\$	pounds	\$	barrels	\$
1885			880,000	17,600								
1886			240,000	5,460								
1887			60,000	1,200								
1888			60,000	1,200								
1889												
1890			50,000	1,500								
1891			40,000	1,000								
1892												
1893												
1894			14,000	420								
1895												
1896												
1897	205	1,845										
1898												
1899			114,000	4,872								
1900			606,000	22,725								
1901	521	3,126	1,390,000	41,676								
1902	550	4,400	1,600,000	48,000								
1903	550	3,108	514,000	15,420								
1904												
1905												
1906			402,000	14,058								
1907			660,000	36,209								
1908			1,431,000	41,060							1,519,930	1,910,630
1909			2,258,000	64,100							2,462,027	3,084,218
1910	30	330	3,004,000	75,328							2,504,650	3,150,479
1911	67	736	4,194,000	76,237							3,090,786	3,741,039
1912	92	1,000	4,090,000	89,262							3,044,713	3,372,897
1913	66	720	3,384,000	101,463							3,992,988	4,311,183
1914	119	1,304	3,474,000	104,015							2,775,142	3,062,129
1915	220	2,420	4,792,000	147,830							2,407,670	2,597,807
1916	250	2,750	4,372,000	262,349							2,230,386	2,312,677
1917	120	1,320	5,312,000	658,231	10	2,150					1,676,904	2,267,610
1918	228	2,508	4,964,000	520,525			60	1,020			1,220,003	1,976,815
1919	80	880	5,718,000	488,706							2,023,280	3,650,585
1920	100	1,160	3,662,000	425,617							2,035,594	4,377,814
1921	78	975	2,982,000	233,763							2,723,071	6,424,356
1922	50	575	4,116,000	299,940							3,104,386	6,393,566
1923	53	583	5,158,617	582,785	6	2,600	200	4,180			3,296,428	5,855,589
1924	90	1,225	3,745,225	313,281	172	91,900			12,863	27,913	3,564,499	5,668,671
1925	40	500	2,156,441	113,324	2	901			19,667	18,566	3,462,358	5,253,911
1926	80	1,000	4,055,477	135,549	14	3,935			6,440	6,440	3,398,860	4,792,857
1927	86	1,075	4,961,178	197,668					2,072	1,003	3,751,786	5,144,326
1928	70	875	4,097,226	178,149					14,002	5,067	3,911,795	5,520,897
1929	30	375	3,742,913	154,887					27,446	23,413	4,624,712	6,608,246
1930	34	437	2,750,887	109,932					12,732	6,366	3,942,690	5,779,404
1931	35	456	3,575,936	135,170					7,331	3,532	3,470,056	5,006,826
1932			2,424,342	98,714					16,798	7,289	1,599,342	2,288,975
1933			1,468,022	56,534			20	60	7,580	3,731	1,095,845	1,587,812
1934	30	365	1,647,513	56,412					7,552	3,444	1,702,128	2,403,590
1935			2,558,789	75,326					7,079	6,796	1,243,836	1,752,148
1936			1,365,606	42,491					3,552	3,516	1,542,463	2,180,895
1937			1,389,426	41,032	1	250			5,711	5,654	2,650,652	3,657,067
1938			2,175,646	56,538					9,516	9,754	1,818,032	2,555,214
1939			1,741,917	52,257	18	720					1,709,263	2,437,777
1940			2,093,275	62,798			305		17,789	24,620	2,355,352	3,518,247
1941			1,482,000	64,171					7,499	10,379	2,748,854	4,019,656
1942			1,504,049	152,331					2,333	3,219	2,784,782	3,998,294
Totals	3,874	36,048	118,477,485	6,479,115	223	102,456	585	13,476	187,962	170,702	91,485,263	132,664,207

In 1925 Ontario produced 1,751 pounds of antimony valued at \$206 and in 1926 some 1,596 pounds worth \$281 were produced.

In 1929 4,456 pounds beryl crystals, \$114.

(d) Data not available prior to 1908; cement was produced in Ontario as early as 1867.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

—	Chromite		Clay Products	Cobalt		Copper		Corundum		Diatomite	
	tons	\$	\$	pounds	\$	pounds	\$	tons	\$	tons	\$
1886			881,039			165,000	18,150				
1887			1,187,453			322,524	36,284				
1888			1,123,671								
1889			1,182,397			1,466,752	201,678				
1890			1,347,278			1,303,065	205,233				
1891			1,076,154			4,127,697	531,234				
1892			1,313,877			2,203,795	254,538				
1893						3,641,504	391,461				
1894						5,207,679	497,854				
1895						4,576,337	492,414				
1896						3,167,256	344,598				
1897						5,500,652	621,023				
1898			1,449,536			8,375,223	1,007,539				
1899			1,828,936			5,723,324	1,007,877				
1900			2,009,915			6,740,058	1,091,215	3	300		
1901			2,222,620			8,695,831	1,401,507	387	46,415		
1902			2,149,451			7,408,202	864,278	768	84,465		
1903			2,402,520			7,172,533	949,285	703	77,510		
1904			2,206,200	32,000	19,960	4,913,564	630,070	993	109,545		
1905			2,696,500	236,000	100,000	8,779,259	1,368,686	1,644	149,153		
1906			3,136,870	642,000	80,704	10,638,231	2,050,938	2,274	204,973		
1907			3,123,372	1,478,000	104,426	14,104,337	2,821,432	1,892	177,922		
1908			2,476,152	2,448,000	111,118	15,005,171	1,981,883	1,089	100,398		
1909			3,425,841	3,066,000	94,965	15,746,699	2,044,237	1,491	162,492		
1910			3,667,810	2,196,000	54,699	19,256,016	2,453,213	1,472	161,873		
1911			3,916,575	1,704,000	170,890	17,932,263	2,219,297	1,177	137,031		
1912			4,864,700	1,868,000	314,381	22,250,601	3,635,971	1,960	239,091		
1913			5,220,467	1,642,000	420,386	25,585,029	3,952,522	1,177	137,031		
1914			3,979,606	889,027	571,710	28,948,211	3,937,536	548	72,176		
1915			2,254,863	504,212	536,268	39,361,464	6,799,693	262	33,138		
1916			2,145,036	840,536	924,590	44,997,035	12,240,094	87	10,307		
1917			2,575,304	1,079,572	1,727,315	42,867,774	11,651,461	188	32,153		
1918			2,434,215	1,347,544	3,368,860	47,074,475	11,593,502	137	26,112		
1919			4,574,796	530,371	1,325,928	24,346,623	4,550,627				
1920			5,613,488	546,023	1,365,058	32,059,993	5,596,392	196	24,547		
1921			5,183,125	251,986	755,958	12,821,385	1,602,930	403	55,965		
1922			6,944,218	569,960	1,852,370	10,943,636	1,464,477				
1923			6,270,615	888,061	2,530,974	31,656,800	4,565,227				
1924			5,089,299	948,704	1,682,395	37,113,193	4,833,622				
1925			5,195,084	1,116,492	2,328,517	39,718,777	5,577,311				
1926			5,356,489	664,778	1,136,014	41,312,867	4,828,964				
1927			5,853,035	880,590	1,764,534	45,341,295	4,946,533				
1928			6,177,664	954,860	1,671,900	66,607,510	8,770,149				
1929			6,830,162	929,415	1,801,915	88,879,853	14,622,572				
1930			5,221,214	694,163	1,144,007	127,718,871	15,187,259			10	140
1931			3,552,800	521,051	651,179	112,882,625	9,096,463			60	840
1932			1,639,608	490,631	537,957	77,055,413	4,407,928			11	309
1933			1,024,579	466,702	597,752	145,504,720	10,118,847			28	1,298
1934	40	480	1,261,006	594,671	592,497	205,059,539	14,822,704			46	1,920
1935		9,576	1,370,225	681,419	512,705	252,027,928	19,295,965			100	4,600
1936		5,070	1,573,936	887,591	804,676	287,914,078	26,898,920			40	2,000
1937		39,964	2,038,845	507,064	848,145	322,039,208	41,716,364			38	1,868
1938			2,083,496	459,226	790,913	309,030,106	30,405,500				
1939			2,346,638	732,561	1,213,454	328,429,665	32,637,305			5	280
1940			2,508,540	794,359	1,235,220	347,931,013	34,742,229				
1941			3,087,616	263,257	255,904	333,829,767	33,192,644				
1942			2,549,486	83,871	88,444	308,282,414	30,625,404				
Totals		55,090		35,430,697	36,138,688	4,022,068,770	443,802,933	19,524	2,104,251	338	13,255

* Exclusive of cobalt in ore placed on government stock pile at Deloro, Ontario.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

	Feldspar		Fluorspar		Gold		Graphite		Gypsum†	
	tons	\$	tons	\$	fine oz.	\$	tons	\$	tons	\$
1875									120	180
1876									489	675
1878									579	720
1879									875	1,240
1880									657	1,040
1881									1,249	1,946
1882									462	837
1883									688	1,254
1884									525	787
1885									5,826	12,000
1886									8,560	11,715
1887					327	6,760			6,700	10,200
1888									7,382	13,128
1889									6,200	8,075
1891					97	2,000			5,660	18,300
1892					344	7,118			4,320	5,399
1893					708	14,637			2,898	10,193
1894					1,917	39,624			2,369	6,187
1895					3,015	62,320			2,420	4,840
1896					5,563	115,000	650	13,000	3,305	7,786
1897					9,157	189,294	100	3,000	1,461	4,661
1898					12,863	265,889	300	6,000	1,087	4,201
1899					20,394	421,591	1,220	16,179	1,020	3,978
1900	163	570			14,391	297,495	1,500	24,000	1,095	4,331
1901	4,816	9,632			11,844	244,837	1,750	31,500	1,504	5,692
1902	7,576	15,152			11,118	229,828	795	15,900	1,917	7,699
1903	13,910	18,934			9,096	188,036	728	23,745	2,720	21,988
1904	11,083	22,166			1,935	40,000	367	8,980	2,390	18,350
1905	11,700	23,400	12	84	4,402	91,000	481	16,255	1,853	23,834
1906	16,948	40,890			3,202	66,193	262	10,000	2,965	24,420
1907	12,584	29,819			3,212	66,398	459	11,000	10,404	52,417
1908	7,877	21,099			3,212	66,398	210	5,040	10,380	42,456
1909	12,686	38,664			1,569	32,425	730	37,624	11,731	48,278
1910	15,719	45,867	2	15	3,089	63,849	1,237	58,087	15,055	67,229
1911	17,706	51,684	34	238	2,062	42,625	895	36,492	27,399	98,018
1912	13,633	28,916	40	240	86,523	1,788,596	1,456	66,442	53,119	176,056
1913	16,716	59,241			219,801	4,543,690	2,059	80,662	62,315	208,029
1914	17,962	68,668			268,264	5,545,509	1,386	88,317	81,219	204,033
1915	13,987	55,796			406,577	8,404,693	2,560	118,792	81,172	190,422
1916	14,878	53,332	1,284	10,238	492,481	10,180,485	3,476	249,586	36,668	116,086
1917	18,274	81,622	4,249	68,756	423,261	8,749,581	3,173	296,587	48,947	130,138
1918	18,591	108,449	7,187	150,779	411,976	8,516,299	2,934	208,852	38,214	151,564
1919	13,754	73,158	3,425	59,281	505,739	10,454,553	1,340	99,821	58,899	278,120
1920	37,224	270,843	3,758	68,475	564,995	11,679,483	1,957	133,704	74,707	404,162
1921	20,115	150,457	116	1,744	708,213	14,640,062	899	63,439	84,790	433,053
1922	15,255	120,576	284	3,905	1,000,340	20,678,862	573	29,853	110,227	621,668
1923	17,199	134,822	64	597	971,704	20,086,904	1,068	65,557	99,958	542,317
1924	28,657	216,422	76	1,343	1,241,728	25,668,795	1,288	72,842	88,121	467,097
1925	17,394	141,059	12	200	1,461,039	30,202,357	2,210	127,863	82,020	491,833
1926	22,783	199,102			1,497,215	30,950,180	2,401	165,344	89,987	496,059
1927	17,119	154,533			1,627,050	33,634,108	1,795	109,613	83,998	500,688
1928	18,954	180,153			1,578,434	32,629,126	1,047	52,373	85,811	553,271
1929	21,737	206,979	70	1,120	1,622,267	33,535,234	1,288	90,522	100,347	832,689
1930	9,722	104,667	80	1,240	1,736,012	35,886,532	1,338	86,542	94,946	776,069
1931	7,962	100,119	40	620	2,085,814	44,980,280	548	32,149	53,358	374,469
1932	3,657	42,920	32	464	2,280,105	53,534,743	346	18,483	35,655	186,175
1933	4,387	45,350	73	1,064	2,165,519	61,647,843	362	16,145	24,460	112,319
1934	7,302	61,665	150	2,100	2,105,339	72,634,195	1,389	64,998	33,234	141,389
1935	8,656	75,003	75	900	2,220,336	78,133,624	1,761	78,500	38,247	164,807
1936	8,409	70,840	75	900	2,378,503	83,318,960		88,812	40,191	182,783
1937	9,061	72,610	150	2,550	2,587,095	90,522,454		125,343	53,780	233,895
1938	8,106	65,964	217	3,906	2,896,477	101,883,578		41,590	57,503	242,470
1939	7,061	51,056	240	4,995	3,086,076	111,538,873		61,684	59,440	260,792
1940	12,907	98,619	4,437	58,952	3,261,688	125,574,988		94,038	75,271	313,512
1941	11,822	107,124	5,234	93,867	3,194,308	122,980,858		132,924	90,599	276,459
1942	5,468	49,353	4,340	113,957	2,763,819	106,407,032		117,904	82,796	304,170
Totals	581,520	3,567,295	35,756	652,530	47,962,215	1403480814		3,396,083	2,251,264	10,910,648

† 1876 to 1885, inclusive, exports.

Garnets...1923—1,245 tons, value \$100,000
1924— 360 " " 7,200Garnet schist 1941—16 tons, value \$160
1942—17 " " 176

Grinding pebbles—1920—560 tons, value not available.

1925—105 " " 945
1926— 64 " " 576

Table 12.—Historical Summary of the Mineral Production of Ontario—Concluded

—	Iron Ore		Lead		Lime		Mica		Mineral Waters (Natural)	
	tons	\$	pounds	\$	bushels	\$	tons	\$	imp. gals	\$
1886	16,032				783,450	140,290		22,017		
1887	16,598				1,239,451	178,153		21,540		
1888	16,894				1,296,343	169,194	15	30,207		
1889					1,622,892	136,814		27,222		
1890					1,234,975	185,602		58,484		
1891					1,227,681	152,286		44,510		
1892								81,745		
1893										
1894										
1895										
1896	15,270				1,880,000	222,000		*		
1897	2,770				*	*		59,000		
1898	21,111				2,620,000	308,000		12,000		
1899	25,126				4,342,500	535,000		29,475		
1900	82,950				3,983,000	544,000		60,000		
1901	272,538				4,100,000	550,000		40,000		
1902	359,288				4,300,000	617,000	993	101,600		
1903	209,634		50,000		3,400,000	520,000		103,738		
1904	141,601		885,000	38,135	2,600,000	406,800		84,290		
1905	193,464		284,212	13,378	3,100,000	424,700		68,563		
1906	141,078	337,918	2,200,000	124,454	2,885,000	496,785	291	144,579		
1907	207,769	488,324			2,333,879	393,474	456	88,402		
1908	216,177	528,475			2,087,731	358,507	288	57,258		61,526
1909	21,956	61,954			2,619,553	434,147	241	54,484		111,369
1910	90,979	257,781			2,988,020	476,137	442	103,090		92,610
1911	5,379	12,577			3,380,265	538,902	373	59,212		136,778
1912	14,567	28,125			3,376,193	573,269	384	62,932		131,529
1913	110,135	237,976	33,000	1,537	3,254,482	573,209	478	68,816		138,072
1914	55,635	124,459			3,393,078	556,850	349	40,267		115,215
1915	86,047	173,120	88,985	4,983	1,903,914	328,515	200	41,515		95,788
1916	137,399	385,381	685,932	58,393	2,031,396	367,115	364	62,896		110,333
1917	152,764	542,097	1,586,711	176,712	2,846,580	668,368	392	72,121		135,231
1918	109,942	404,188	1,684,366	155,804	2,660,791	762,976	266	42,431		145,400
1919	5,562	45,520	1,487,586	103,625	3,578,834	1,143,973	325	55,351		55,958
1920	6,683	54,266	2,255,520	201,643	5,109,635	1,962,085	1,466	94,562		
1921	48	242	3,312,493	190,203	3,530,547	1,344,188	218	28,891	308,647	14,438
1922			2,890,397	180,216	4,980,183	1,767,543	1,989	54,515	209,072	10,528
1923	5,358	18,878	4,401,494	315,983	6,002,621	1,893,663	1,980	110,290	227,030	14,047
1924			5,055,368	409,687	5,419,307	1,840,152	2,414	172,252	201,670	13,133
1925			7,209,534	657,510	6,304,831	2,044,125	1,605	82,663	183,012	25,452
1926			7,398,795	580,730	6,522,747	2,051,446	1,881	59,086	208,400	27,277
1927			7,990,709	528,729	6,946,630	2,198,239	1,284	75,183	293,200	12,811
1928			6,814,757	402,289	7,919,600	2,467,843	2,559	32,944	253,630	27,890
1929			4,769,506	294,431	10,575,943	3,364,411	2,991	45,919	309,700	13,651
1930			2,193,856	116,034	7,201,886	2,177,537	740	34,275	214,200	20,754
1931			985,633	41,647	4,218,857	1,222,270	1,049	23,465	197,540	8,578
1932			86,477	1,828	4,762,943	1,273,230	268	2,752	61,208	2,473
1933			29,910	692	4,176,943	1,227,197	666	9,371	29,794	2,347
1934			21,558	525	5,548,314	1,536,289	618	9,059	21,775	1,622
1935			22,532	706	6,239,714	1,696,887	255	7,144	19,900	1,477
1936			17,442	633	7,045,514	1,946,060	529	11,433	23,100	1,117
1937			29,849	1,525	8,413,343	2,152,644	399	9,137	26,700	889
1938			22,363	748	7,727,943	1,989,259	252	6,445	28,416	2,556
1939	123,598	341,594	39,130	1,240	8,635,971	2,238,952	564	22,978	19,140	1,602
1940	414,603	1,211,305	345,455	11,614	10,646,686	2,752,787	458	31,962	31,638	2,426
1941	516,037	1,426,057	1,622,823	54,559	12,317,857	3,246,648	794	47,047	36,623	14,469
1942	545,119	1,516,142	3,183,159	107,018	11,877,085	3,125,574	1,400	89,243	28,023	14,189
Totals.	4,340,111	8,256,379	69,684,552	4,779,380	239,225,378	60,279,126		2,855,361		1,578,038

10 tons iron oxides at \$160 in 1911.

The value of molybdenite produced to the end of 1938 totalled \$157,811, including the following outputs: 1838: 14,000 lb. value \$4,500. 1937: 16,000 lb. value \$8,147. 1931: 1,222 lb. value \$280. 1918: 42,931 lb. value \$49,371. 1917: 68,213 lb. value \$68,213. 1915: 23,300 lb. value \$25,800 and \$1,500 worth in 1914. 482 pounds valued at \$216 were produced in 1939 and 423 pounds valued at \$150 in 1942. Magnesium metal was produced in Ontario for the first time in 1942, the recovery from Ontario dolomite totalling 473,910 pounds worth \$208,520.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

	Natural Gas		Nephe- line Syenite	Nickel		Peat		Petroleum		Phosphate (a)	
	M cu. ft.	\$	\$	pounds	\$	tons	\$	barrels	\$	tons	\$
1870..										1,200	13,600
1871..										200	2,100
1872..											
1873..											
1874..											
1875..											
1876..											
1877..											
1878..											
1879..										*	824 12,278
1880..										*	1,842 20,565
1881..										*	1,887 14,422
1882..								368,987		*	2,471 36,117
1883..								389,573		*	568 6,338
1884..								472,866		*	50 500
1885..								571,000		*	763 8,890
1886..								587,563		*	434 5,962
1887..								584,061	525,655	1,060	15,735
1888..								713,728	556,708	4,101	55,363
1889..								695,203	713,695	2,089	22,506
1890..				830,477	498,286			704,690	653,600	3,436	29,282
1891..				1,435,742	933,232			795,030	902,734	4,581	51,065
1892..		150,000		4,035,347	2,421,208			755,298	1,010,211	8,344	35,187
1893..		376,233		2,413,717	1,399,956			779,753	984,438	1,701	22,460
1894..		313,754		3,982,982	2,071,151			798,406	874,255	240	1,886
1895..		423,032		4,907,430	1,870,958			829,104	835,322		
1896..		276,301		3,888,525	1,360,984			726,138	1,086,738		
1897..		325,873		3,397,113	1,188,990			726,822	1,155,647		
1898..		322,123		3,997,647	1,399,176			709,857	1,011,546		
1899..		387,271		5,617,690	1,820,838			758,391	1,061,747	101	505
1900..		417,094		5,744,000	2,067,840			808,570	1,202,020	1,721	10,326
1901..		339,476		7,080,227	3,327,707	400	1,200	710,498	1,151,007	145	1,015
1902..		195,992		9,189,047	4,594,523	220	600	622,392	1,008,275		
1903..		196,635		10,693,410	5,025,903	475	1,663	530,624	951,190		
1904..		253,524		12,505,510	5,002,204	1,100	3,300	486,637	1,048,874		
1905..		316,476		10,547,883	4,219,153	800	2,400	503,474	935,895		
1906..		533,446		18,876,315	7,550,526	80	260	634,095	856,028		
1907..		746,499		21,490,955	8,948,834	474	1,422	569,753	761,760	250	1,875
1908..		949,297		21,189,793	9,535,407	50	200	726,872	1,057,088	416	2,608
1909..		1,145,307		19,143,111	8,231,538	60	180	527,987	747,102	998	8,894
1910..		1,271,303		26,282,991	9,461,877	60	240	420,755	559,604	473	3,254
1911..	10,863,871	1,807,513		37,271,033	11,181,310	771	2,324	314,410	386,724	22	192
1912..	12,529,462	2,036,245		34,098,744	10,229,623	1,263	3,017	288,631	354,054	35	297
1913..	12,474,745	2,055,768		44,841,542	13,452,463	200	900	240,657	341,251		
1914..	14,094,521	2,215,808		49,676,772	14,903,032	600	2,100	225,969	402,677		
1915..	15,211,523	2,622,838		45,517,937	13,655,381	685	2,470	212,693	338,182	400	2,400
1916..	17,953,109	2,765,105		68,308,657	20,492,597	300	1,050	214,444	299,149	17	102
1917..	19,868,035	3,641,587		82,958,564	29,035,497	300	1,500	196,778	389,621	13	174
1918..	13,029,524	2,884,460		84,330,280	33,732,112			202,991	473,477	26	256
1919..	11,024,041	2,690,400		92,507,293	37,002,917			288,692	777,737		
1920..	10,529,374	2,920,731		44,544,883	17,817,953	500	1,750	219,804	625,342	2	81
1921..	8,422,774	3,080,130		61,335,706	24,534,282	4,550	18,650	180,071	726,286		
1922..	8,128,413	4,066,246		19,293,060	6,752,571	1,666	6,664	172,859	559,198		
1923..	8,060,114	4,076,296		17,597,123	6,158,993	3,000	14,500	164,731	526,316	59	476
1924..	7,143,962	3,958,006		62,453,843	18,332,077			159,400	478,149		
1925..	7,150,078	3,798,381		69,536,350	19,470,178			154,368	441,952		
1926..	7,143,962	3,958,006		73,857,114	15,946,672	1,370	8,394	143,134	386,555		
1927..	7,764,996	4,409,593		65,714,294	14,374,163			137,850	379,221		
1928..	7,311,215	4,331,780		66,798,717	15,262,171			139,606	288,347	82	824
1929..	7,632,800	4,535,312		96,755,578	22,318,907	1,497	5,845	134,094	249,737		
1930..	8,586,475	4,959,695		110,275,912	27,115,461	1,000	4,500	121,194	253,678		
1931..	7,965,761	5,034,828		103,768,857	24,455,133	628	1,602	117,302	235,746		
1932..	7,419,534	4,523,085		65,666,320	15,267,453	504	1,096	122,365	219,993		
1933..	7,386,154	4,719,297		30,327,968	7,179,862	2,486	5,307	130,343	247,468		
1934..	7,166,659	4,523,085		83,264,658	20,130,480	450	900	136,058	253,486		
1935..	7,682,851	4,741,368		128,687,340	32,139,425	1,878	7,343	141,385	299,874		
1936..	8,158,825	4,938,084		138,516,240	35,345,103	1,340	5,761	165,041	346,156	70	60
1937..	10,006,743	6,052,294	37,426	169,739,393	43,876,525	1,296	7,121	165,495	350,767		
1938..	10,746,334	6,588,798	121,481	224,790,974	59,469,423	478	2,676	165,205	356,000		
1939..	10,952,806	6,460,764	142,737	210,572,738	53,914,494	620	3,500	172,641	359,268		
1940..	11,966,581	7,261,928	140,148	226,105,865	50,920,305	445	2,445	206,379	401,430		
1941..	13,053,403	7,745,834	117,849	245,557,871	59,822,591	30	75	187,644	397,078		
1942..	11,828,703	7,140,130	227,583	282,258,235	68,656,795	(b) 4,670	44,863	160,238	337,760		
	10,476,770	6,809,901	246,893	285,211,803	(c) 69,998,427	(b) 9,599	148,933	143,845	306,242	334	4,458
Total	148,447,236	1,034,117	3,619,291,576	995,874,667	45,845	316,751	24,496,444			35,455	391,983

(a) No record of production 1872-1877.
moss valued at \$147,729.

(b) Includes 4,315 tons of moss valued at \$42,708.

(c) Includes 9,427 tons of

* Exports.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

—	Platinum		Palladium		Other Platinum Metals		Quartz (a)		Salt	
	Fine oz.	\$	Fine oz.	\$	Fine oz.†	\$	Tons	\$	Tons	\$
1890.....							200	1,000		
1891.....										
1892.....										
1893.....							100	500		
1894.....										
1895.....										
1896.....							10	50		
1897.....										
1898.....							284	570	57,142	248,639
1899.....							600	1,260	59,339	254,390
1900.....									62,055	279,458
1901.....									59,428	262,325
1902.....			4,411	86,014					64,456	292,581
1903.....			3,177	61,952					62,452	297,517
1904.....			952	18,564					69,477	321,778
1905.....			1,562	28,116					67,340	320,858
1906.....			314	5,652						
1907.....							48,376	65,765	76,720	329,130
1908.....							56,585	124,148	72,607	342,315
1909.....							44,741	52,830	79,975	378,798
1910.....							56,924	71,285	84,037	415,219
1911.....							87,400	90,945	84,092	409,624
1912.....							59,978	83,181	91,552	443,004
1913.....							99,686	193,976	95,053	459,582
1914.....							77,253	167,842	100,791	491,280
1915.....							52,947	83,628	107,038	493,648
1916.....							95,771	143,257	119,900	600,226
1917.....							94,519	167,636	132,903	717,653
1918.....							177,983	362,251	138,909	1,047,792
1919.....	25	1,447	62	3,534			216,539	474,772	131,727	1,285,039
1920.....	578	36,961	913	58,392	513	31,815	60,055	179,549	148,112	1,395,291
1921.....	269	20,184	591	38,267	57	9,690	90,433	321,063	206,832	1,512,724
1922.....	458	44,709	724	47,060	391	31,280	72,068	220,806	161,987	1,649,626
1923.....	1,210	141,010	1,732	138,560	304	45,000	81,528	118,054	176,741	1,573,657
1924.....	9,181	1,090,858	8,923	811,993	593	51,120	225,110	483,285	197,917	1,674,365
1925.....	8,692	1,027,477			8,288	648,969	111,645	192,855	203,428	1,337,311
1926.....	9,471	919,349			10,024	640,178	188,560	324,526	226,315	1,352,504
1927.....	11,217	716,653			13,087	605,563	192,733	339,304	252,345	1,388,672
1928.....	10,452	704,360			11,545	554,190	159,150	266,204	254,181	1,510,777
1929.....	12,474	843,926			13,087	605,563	194,503	308,608	279,841	1,377,629
1930.....	34,000	1,542,172			17,141	802,453	167,487	274,674	248,637	1,558,405
1931.....	44,725	1,595,117			34,040	894,511	187,973	316,050	302,445	1,420,424
1932.....	27,284	1,097,021			46,918	1,217,717	97,888	148,642	231,329	1,760,388
1933.....	24,746	856,190			37,613	90,890	66,135	93,574	231,138	1,789,751
1934.....	116,177	4,488,712			31,009	645,043	66,562	86,146	244,107	1,755,087
1935.....	105,335	3,444,455			83,932	1,699,282	89,838	134,572	276,751	1,734,196
1936.....	131,551	5,319,922			84,772	1,962,937	83,034	120,005	320,003	1,695,508
1937.....	139,355	6,751,750			103,671	2,483,075	884,585	216,037	350,044	1,557,078
1938.....	161,310	5,196,279			119,829	3,179,782	1,142,372	633,073	407,701	1,539,599
1939.....	148,877	5,221,712			130,893	3,677,342	1,173,259	597,037	388,130	1,637,140
1940.....	108,464	4,239,424			135,402	4,199,622	1,333,342	665,148	370,843	2,200,189
1941.....	124,257	4,747,860			91,522	3,520,746	1,581,367	810,285	412,401	2,371,780
1942.....					97,432	3,396,304	1,745,244	899,687	477,170	2,512,166
Totals...	Censored		Censored		Censored		1,367,733	914,256	558,407	2,793,328
			23,361	1,298,104	1,058,976	30,387,509	12,532,500	10,748,336	8,743,918	50,791,454

†Other platinum metals include palladium from 1925 to 1942.
(a) From 1936 includes low grade silica fluxing sand.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

—	Sand and Gravel		Selenium		Silica Brick		Silver	
	Tons	\$	Pounds	\$	M	\$	Fine oz.	\$
1887							190,495	186,304
1888							208,064	195,580
1889							181,609	169,986
1890							158,715	166,066
1891							225,633	222,926
1892							41,581	36,425
1893								8,689
1894								
1895								
1896								
1897							5,000	2,990
1898							85,000	49,521
1899							202,000	120,352
1900							161,650	99,140
1901							151,400	89,250
1902							145,000	75,632
1903							17,777	9,502
1904							206,875	118,376
1905							2,451,356	1,479,442
1906							5,401,766	3,607,894
1907							9,982,363	6,521,178
1908							19,398,545	10,254,847
1909							24,822,099	12,754,126
1910							30,366,366	16,241,755
1911							30,540,754	16,279,443
1912							29,214,025	17,772,352
1913							28,411,261	16,987,377
1914							25,139,214	13,779,055
1915	3,033,383	727,426					22,748,609	11,302,419
1916	3,711,231	818,947					21,608,158	14,188,133
1917	4,283,076	1,170,052					19,301,835	15,714,975
1918	(c)	(c)					17,198,737	16,643,562
1919	(c)	(c)					12,117,878	13,465,628
1920		1,931,924					9,907,626	9,996,795
1921	6,273,173	1,496,729					9,761,607	6,116,037
1922	6,285,123	2,184,174					10,811,903	7,300,305
1923	8,146,433	2,006,958					10,540,943	6,838,226
1924	6,174,284	2,041,959					11,272,567	7,527,933
1925	5,201,604	1,779,129					10,529,131	7,271,944
1926	6,483,163	2,292,678			1,307	66,241	9,274,965	5,760,402
1927	7,512,763	2,405,729			553	28,549	9,307,953	5,246,893
1928	10,389,408	2,230,307			1,597	86,323	7,242,601	4,213,456
1929	11,358,568	3,462,379			1,566	80,374	8,890,726	4,711,462
1930	12,027,082	3,783,830			378	19,120	10,205,683	3,893,876
1931	7,465,017	2,562,477	16,899	32,108	279	13,702	7,438,951	2,222,014
1932	6,994,447	1,971,239			93	4,304	6,335,788	2,006,648
1933	5,967,994	2,517,230	26,090	53,745	183	7,351	4,535,680	1,715,975
1934	7,880,959	1,821,689	51,574	91,286	369	14,730	5,321,160	2,525,470
1935	8,770,117	2,211,406	75,363	144,697	493	22,976	5,161,651	3,344,229
1936	8,498,153	2,227,620	106,300	188,151	471	26,715	5,219,366	2,355,343
1937	8,832,526	3,613,854	116,696	201,884	818	59,980	4,693,047	2,106,286
1938	8,531,281	3,046,043	54,577	94,691	595	50,592	4,318,837	1,877,701
1939	9,350,875	3,557,216	126,930	224,539	603	49,595	4,689,422	1,898,653
1940	9,678,745	4,025,026	136,350	260,429	629	62,661	5,563,101	2,127,831
1941	11,569,382	4,524,463	142,498	272,171	1,283	118,922	4,977,476	1,904,432
1942	8,420,358	3,433,986	76,000	145,920	1,183	120,495	4,452,787	1,877,562
Totals			929,277	1,709,621	12,400	832,630	471,136,736	283,412,398

(c) Included with Other Products, data not available by provinces.

Table 12.—Historical Summary of the Mineral Production of Ontario—Continued

	STONE									
	Granite		Limestone		Marble		Sandstone		Slate	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1909.....		42,700		639,674		3,441		62,824		
1910.....		109,678		722,763		4,100		62,247		
1911.....		131,816		680,461		25,996		54,032		
1912.....		174,946		862,052		12,926		59,240		
1913.....		324,062		1,196,130		18,238		54,738		
1914.....		309,720		853,906		30,300		59,923		
1915.....		140,894		634,728		10,927		19,588		
1916.....		135,826		688,114				33,083		
1917.....		119,301		808,658				64,516		
1918.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)		
1919.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)		
1920.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)		
1921.....	165,418	233,353	2,547,625	3,927,836			3,037	6,393		
1922.....	185,738	412,995	2,128,769	2,547,561			2,758	9,370		
1923.....	188,998	293,454	2,436,453	2,542,320			5,473	23,378		
1924.....	214,691	208,219	2,614,911	2,551,111			10,571	30,038		
1925.....	263,567	242,150	2,750,115	2,530,621			9,030	44,562		
1926.....	398,253	359,217	3,214,544	2,742,424	586	13,755	8,659	41,892		
1927.....	390,679	294,098	3,854,421	3,716,419			9,860	50,192		
1928.....	605,275	566,601	3,967,098	3,421,064			9,556	53,903		
1929.....	850,927	926,977	4,380,706	3,759,357			8,039	49,929		
1930.....	856,124	876,110	4,524,661	3,876,527	7,345	51,085	8,103	46,806		
1931.....	133,905	232,557	3,215,697	2,594,328	4,323	20,173	5,439	25,386		
1932.....	73,272	186,357	1,825,793	1,419,049	2,065	40,175	4,008	9,435		
1933.....	19,650	39,433	1,222,752	910,419	2,614	21,083	8,890	12,333		
1934.....	75,526	128,386	2,370,339	1,788,107	4,331	20,556	10,104	28,458	120	600
1935.....	44,473	93,465	2,061,206	1,680,810	4,728	35,210	12,536	54,407		
1936.....	492,227	582,603	2,205,992	1,773,764	4,765	29,204	3,436	10,805	260	2,080
1937.....	625,160	769,860	3,582,175	2,841,469	6,685	27,247	8,680	22,934	300	2,258
1938.....	254,917	351,941	2,242,964	1,911,841	10,537	40,694	4,662	16,220	211	2,469
1939.....	495,619	625,880	1,931,285	1,624,618	6,519	30,642	4,124	16,322	47	649
1940.....	529,440	704,421	3,302,596	2,649,809	4,792	22,157	3,446	11,008		
1941.....	152,426	388,325	3,353,856	2,832,056	6,540	30,365	13,420	27,190		
1942.....	90,530	288,828	2,992,885	2,636,431	4,295	27,675	18,835	33,004		

(a) 1918-1920, total values of all kinds of stone—1918, \$1,079,745; 1919, \$1,936,268; 1920, \$4,035,478.

Table 12.—Historical Summary of the Mineral Production of Ontario—Concluded

	Sulphur (b)		Talc (a)		Tellurium		Zinc (e)		Other Products
	tons	\$	tons	\$	pounds	\$	pounds	\$	\$
1886.....			50	400					
1887.....			100	800					
1888.....			140	280					
1889.....			195	1,170					
1890.....			917	1,239					
1891.....									
1892.....			1,374	6,240					
1893.....			717	1,920					
1894.....			916	1,640					
1895.....			475	2,138					
1896.....			410	1,230					
1897.....			157	350					
1898.....			405	1,000					
1899.....			450	1,960			814,000	46,805	
1900.....			1,420	6,365			190,400	8,359	
1901.....			259	842					
1902.....			689	1,804			142,200	6,882	
1903.....			990	2,739			900,000	48,600	
1904.....			840	1,875			477,568	24,350	
1905.....			500	1,800					
1906.....			1,234	3,030			500	6,700	
1907.....			1,534	4,602			217	3,000	
1908.....	20,738	65,236	1,016	3,048			452	3,215	(c)(d) 319,563
1909.....	29,344	92,812	4,350	10,300			895	3,215	(c) 383,875
1910.....	29,628	84,902	7,112	22,308			576	5,760	(c) 632,644
1911.....	43,544	118,265	7,300	22,100					498,110
1912.....	20,677	70,689	8,270	23,132			10	375	363,668
1913.....	71,252	171,925	12,250	45,980					638,771
1914.....	110,616	273,716	10,808	40,418					833,635
1915.....	143,303	414,250	11,885	40,554					
1916.....	177,552	555,523	13,051	48,575					17,956
1917.....	288,058	1,080,896	15,778	76,139					
1918.....	268,507	1,133,963	18,169	119,197					1,316,426
1919.....	117,011	285,832	18,542	115,795			147,692	10,838	1,192,516
1920.....	148,652	618,283	21,411	162,784			13,950	1,070	
1921.....	27,785	101,306	9,967	140,300					
1922.....	11,233	39,763	12,854	178,728					
1923.....	25,134	99,719	9,531	125,124					
1924.....	11,429	44,542	10,718	130,577					
1925.....	685	8,799	13,678	174,116			179,545	13,685	
1926.....	371	4,912	14,882	178,986					
1927.....	463	6,077	15,138	181,981					
1928.....	4,974	54,100	14,925	179,187			58,724	3,226	
1929.....	4,570	51,516	15,463	180,492			5,516,806	297,190	
1930.....	7,277	73,855	11,664	133,213			3,527,894	127,004	
1931.....	6,508	65,080	11,806	122,044					
1932.....	3,332	33,320	12,064	111,585					
1933.....	8,196	81,960	15,114	142,134					
1934.....	14,598	145,980	13,934	135,978	5,130	25,599			
1935.....	13,292	132,920	13,710	138,161	14,275	28,550			
1936.....	14,152	141,520	14,461	143,701	10,197	18,049			
1937.....	14,009	140,090	12,457	123,301	6,651	11,506	120,011	5,883	
1938.....	16,897	168,970	10,853	109,810					
1939.....	16,126	161,260	13,144	128,595					
1940.....	18,688	186,880	15,166	154,734	3,491	5,607			(f) 690
1941.....	10,057	100,570	18,171	204,884	11,453	18,394	1,100,949	37,553	(f) 2,432
1942.....	18,634	186,340	15,499	174,295	9,500	15,200	4,710,394	160,671	(f) 145,241
Totals.....	1,717,301	6,995,738	458,913	4,065,770	60,697	122,905	820,116	6,255,527	

(a) Includes some soapstone from 1925 to 1931.

(b) 1908 to 1927, sulphur content of pyrites shipped; 1928 to 1942, sulphur content of pyrites shipped plus sulphur recovered from smelter gas.

(c) Includes sand-lime brick and sand and gravel. (d) Includes peat.

(e) 1898 to 1904, pounds of zinc contained in ores or concentrates shipped; 1905 to 1915, tons of ore or concentrates shipped; 1916 to 1942, pounds of zinc recovered by Canadian smelters and estimated recoveries by foreign smelters.

(f) Tungsten concentrates: 1940, 1,064 pounds at \$690; 1941, 3,830 pounds at \$2,432, and 1942, 162,185 pounds valued at \$145,241.

NOTE.—In 1919 Ontario produced 48 tons of strontium minerals valued at \$336, in 1920, 75 tons worth \$2,075 were produced, and in 1941, 27 tons worth \$280.

Table 12.—Historical Summary of the Mineral Production of Manitoba

	Cadmium		Cement		Clay Products	Coal		Copper		Feldspar	
	pounds	\$	brls.	\$	\$	tons	\$	pounds	\$	tons	\$
1886.....					14,475						
1887.....					8,125						
1888.....					2,400						
1889.....					19,636						
1890.....					15,300						
1891.....					13,300						
1892.....					67,450						
1893.....					*						
1894.....					*						
1895.....					*						
1896.....					*						
1897.....					*						
1898.....					34,000						
1899.....					25,000						
1900.....					25,000						
1901.....					20,000						
1902.....					(a) 150,000						
1903.....					(a) 150,000						
1904.....					(a) 150,000						
1905.....					588,735						
1906.....					517,065						
1907.....					466,432						
1908.....			11,234	16,851	265,091						
1909.....			8,600	8,600	559,008						
1910.....			18,561	21,995	781,605						
1911.....			21,350	28,289	834,428						
1912.....			12,127	16,068	1,018,051						
1913.....			179,342	326,856	514,358						
1914.....			402,131	737,046	317,488						
1915.....			339,554	625,369	93,674						
1916.....			427,293	794,897	104,248						
1917.....			544,949	1,175,669	114,651			1,116,000	303,329		
1918.....			500,302	1,283,948	116,417			2,339,751	576,234		
1919.....					131,737			3,348,000	625,775		
1920.....					206,764			3,062,577	534,604		
1921.....					208,982						
1922.....			429,352	1,126,137	210,740						
1923.....			320,218	817,664	160,134						
1924.....			286,948	746,750	117,450						
1925.....			407,395	1,037,929	173,794						
1926.....			612,155	1,572,401	248,497						
1927.....			551,698	1,378,121	201,464						
1928.....			693,450	1,685,084	291,791						
1929.....			1,000,258	2,350,606	362,240						
1930.....			977,906	2,268,742	215,967			2,087,609	215,018		
1931.....			544,160	1,267,893	122,628	1,306	3,797	45,821,432	3,835,254		
1932.....			242,112	549,594	49,773	1,552	3,684	52,706,861	3,362,803		
1933.....			129,540	295,351	20,966	3,880	9,214	38,163,181	2,844,989		
1934.....			181,166	411,247	37,916	4,113	8,952	30,867,141	2,290,126	1,793	6,763
1935.....			266,457	604,857	74,755	3,106	7,408	38,011,371	2,963,146	2,084	6,252
1936.....	148,133	131,838	348,042	783,095	55,564	4,029	9,525	29,853,220	2,829,190	1,322	7,932
1937.....	164,223	269,326	328,518	745,736	95,531	3,172	7,709	44,920,835	5,874,747		
1938.....	115,166	92,543	330,889	754,427	105,334	2,016	5,660	65,582,772	6,539,914	78	451
1939.....	73,830	52,029	343,717	773,363	78,892	1,138	3,110	70,458,890	7,110,711	40	330
1940.....	57,742	67,154	572,408	1,287,918	102,906	1,697	4,037	75,267,937	7,591,524		
1941.....	61,085	71,714	576,648	1,274,392	84,817	1,246	3,411	67,018,563	6,759,492		
1942.....	29,236	34,498	654,855	1,374,498	80,890	1,265	3,763	47,595,586	4,300,491		
Total....	649,415	719,102	12,263,335	28,141,393	10,425,469	28,520	70,270	618,221,726	59,057,347	5,405	22,212

* Data not available by provinces.

(a) Includes production of Alberta and Saskatchewan.

Table 12.—Historical Summary of the Mineral Production of Manitoba—Continued

	Gold		Gypsum		Lime		Natural Gas		Quartz		Salt	
	fine oz.	\$	tons	\$	bushels	\$	M cu. ft.	\$	tons	\$	tons	\$
1901.			600	7,800	1886—2,000	460						
1902.			1,554	20,202	1887—32,800	8,500						
1903.			3,160	20,510	1888—57,600	8,940						
1904.			4,000	14,000	1889—52,460	6,646						
1905.			4,500	31,500	1890—69,550	10,700						
1906.			2,500	22,500	1905—1891	Nil						
1907.					620,201	119,792						
1908.					431,548	84,793						
1909.			14,500	111,500	133,786	24,192						
1910.			17,000	170,000	423,954	69,670						
1911.			19,500	195,000	606,679	100,808						
1912.			43,000	372,000	706,888	140,629						
1913.			66,500	481,250	818,237	168,257						
1914.			53,423	382,563	576,938	107,281						
1915.			20,278	139,721	526,167	92,898						
1916.			28,489	191,283	281,432	71,372						
1917.	440	9,095	33,347	258,934	355,301	83,754						
1918.	1,926	39,814	37,483	341,352	393,982	92,932						
1919.	724	14,966	32,903	371,337	462,544	134,725						
1920.	781	16,145	44,371	487,894	476,452	147,131						
1921.	207	4,279	40,859	480,282	605,399	210,984	200	60				
1922.	156	3,225	34,072	440,914	413,283	136,375	200	60				
1923.	31	641	31,575	386,554	525,184	163,799	200	60				
1924.	1,180	24,393	29,375	348,212	524,128	161,226	200	60				
1925.	4,424	91,452	35,088	417,868	394,229	121,518	200	60				
1926.	188	3,886	35,172	461,461	450,315	170,230	200	60				
1927.	182	3,762	39,895	512,008	685,389	251,269	200	60				
1928.	19,813	409,571	51,285	609,039	648,975	246,279	200	60				
1929.	22,455	464,186	67,269	631,051	523,194	319,699	200	60 (a)	1	360		
1930.	23,189	479,359	34,157	298,297	921,314	361,104	600	180	10,045	35,610		
1931.	102,969	2,220,512	23,076	231,124	688,514	260,325	600	180				
1932.	122,507	2,876,350	12,719	113,739	600,400	207,401	600	180	67,214	76,624		
1933.	125,310	3,583,866	6,830	65,471	521,000	172,110	600	180	87,453	102,493	508	7,092
1934.	132,321	4,565,075	9,657	81,553	515,290	167,640	600	180	7,736	23,507	1,499	18,388
1935.	142,613	5,018,551	10,500	85,885	473,371	163,608	600	180	931	3,031	1,664	20,137
1936.	139,273	4,878,733	12,064	87,076	531,857	185,517	600	180	147	220	1,538	18,765
1937.	157,949	5,526,636	13,941	88,095	621,714	211,035	600	180	90	45	2,498	32,151
1938.	185,706	6,532,209	14,571	92,129	645,629	215,165	600	180			3,391	43,465
1939.	180,875	6,537,063	15,961	98,578	566,400	198,685	600	180			2,920	34,979
1940.	152,295	5,863,357	23,108	137,051	572,343	196,190	600	180			2,453	35,888
1941.	150,553	5,796,290	27,601	162,822	633,343	217,547	600	180			3,076	45,731
1942.	136,226	5,244,701	29,218	179,780	774,296	273,492	(b)	(b)			13,051	115,367
					754,971	265,079	(b)	(b)			22,706	397,101
Total	1,894,293	60,208,117	1,090,261	10,107,835	20,623,957	6,349,757	9,000	2,700	173,617	241,890	55,304	769,064

(a) Rose quartz. (b) No reports received; estimated in previous years.

Note.—In 1935 there were produced 19,179 lb. of lead, valued at \$601; in 1937 lithium minerals valued at \$1,694 were also produced.

Table 12.—Historical Summary of the Mineral Production of Manitoba—Concluded

—	Sand and Gravel		Selenium		Silver		Stone					
							Granite		Limestone		Marble	
	tons	\$	lb.	\$	fine oz.	\$	tons	\$	tons	\$	tons	\$
1909								3,345		328,554		
1910								3,643		328,029		
1911								2,268		315,782		
1912		101,653						1,523		381,572		
1913		197,719						6,920		382,984		
1914		314,081						15,654		346,258		
1915	484,244	203,666						351		153,113		
1916	1,157,605	243,542								372,894		
1917	638,802	289,081			7,201	5,863				301,968		
1918					13,316	12,886	(a)	(a)	(a)		(a)	(a)
1917					20,709	23,069	(a)	(a)	(a)		(a)	(a)
1920					15,510	15,649	(a)	(a)	(a)		(a)	(a)
1921					33	20						
1922	780,231	207,415			20	14				56,666		
1923	595,549	123,478			5	3				106,638		
1924	359,535	81,897			140	98				51,304		
1925	727,152	196,691			477	329				54,065		
1926	989,581	178,059			18	11				52,770		
1927	1,333,580	228,655			12	7				101,571		
1928	1,653,929	262,006			1,763	1,026	114,000	114,000		154,666		
1929	1,782,085	322,430			2,644	1,401				121,864		
1930	1,253,103	453,944			94,653	36,114				191,506		
1931	871,986	204,178	3,870	7,353	836,547	249,877				146,316	1,075,485	603
1932	440,309	158,974			1,036,497	328,277	18	232		75,405	885,826	762
1933	288,214	108,828			1,101,578	416,758	332	2,987		32,858	638,226	9,101
1934	334,026	95,426	4,127	6,190	1,252,920	504,647	213	2,702		42,914	299,050	9,994
1935	1,399,659	404,730	65,074	124,942	1,206,454	781,660	387	4,630		146,100	183,892	6,423
1936	1,852,606	545,130	50,760	89,845	791,489	357,175	185	2,038		49,261	69,337	1,233
1937	1,380,957	551,464	43,920	75,982	905,179	406,253	138	1,796		41,053	63,432	90
1938	1,216,084	645,812	57,788	100,262	1,198,315	520,991	329	6,120		39,049	95,497	
1939	1,363,593	514,404	(b)	(b)	1,028,485	416,413	174	3,544		35,949	80,404	
1940	1,851,645	839,993	(b)	(b)	1,033,512	395,308	218	4,324		48,488	74,116	
1941	1,503,901	429,996	32,179	61,462	966,105	369,641	244	4,155		38,103	60,743	
1942	1,443,001	427,150	21,209	40,721	821,824	346,530	133	2,452		43,355	69,514	
Total	8,450,312	278,927	506,757	12,335,397	5,280,013							

(a) Totals by kinds not available. Total values all kinds of stone: 1918, \$238,251; 1919, \$89,067; 1920, \$374,286.

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Year	Tellurium		Zinc		Other Products
	pounds	\$	pounds	\$	
1908					(a) 145,000
1909					
1910					
1911					
1912					
1913					
1914					
1915					
1916					
1917					
1918					294,493
1919					1,340,449
1920					2,179,341
1921					1,047,453
1922					
1923					
1924					
1925					
1926					
1927					
1928					
1929					
1930					
1931			3,882,141	139,757	
1932			35,173,749	898,338	
1933			41,736,600	1,094,016	
1934			43,516,037	1,397,082	
1935			47,264,342	1,438,538	
1936	340	680	51,129,980	1,584,513	
1937	3,928	6,953	36,744,951	1,218,095	
1938	5,124	8,805	36,221,314	1,775,569	
1939	4,454	7,661	46,864,575	1,440,146	
1940	(b)	(b)	40,302,747	1,236,891	
1941	(b)	(b)	35,103,373	1,197,376	
1942	(b)	(b)	34,879,239	1,189,731	(c) 32,342
Total	361	578	29,908,179	1,020,168	(c) 55,832
Total	14,207	24,737	482,727,227	15,540,222	5,094,910

(a) Includes building stone, etc.

(b) No commercial recovery reported by smelter; sometimes recovered by copper refiner but presumed not paid for.

(c) 1,457 tons of peat moss valued at \$32,342 in 1941 and 2,224 tons at \$55,832 in 1942.

NOTE.—In addition there were 177 pounds of tungsten concentrates valued at \$42 shipped in 1918 and 1,399 pounds at \$1,300 in 1942

Table 12.—Historical Summary of the Mineral Production of Saskatchewan

—	Cadmium		Clay Products (b)	Coal*		Copper		Gold (e)		Natural Gas	
	pounds	\$	\$	tons	\$	pounds	\$	fine oz.	\$	M cu. ft.	\$
1886.....			9,400								
1887.....			4,300	(d) 400	800						
1888.....			1,650								
1889.....			9,210								
1890.....			10,090	200	200						
1891.....			23,000								
1892.....			24,937	5,400	9,325						
1893.....				8,325	12,485						
1894.....				(c) 15,051	15,153						
1895.....				15,769	31,538						
1896.....				15,706	25,059						
1897.....				25,000	37,500						
1898.....				25,000	37,500						
1899.....				25,000	37,500						
1900.....				40,500	60,750						
1901.....				45,000	72,000						
1902.....			(a)	70,400	112,640						
1903.....			(a)	116,703	169,618						
1904.....			(a)	124,885	187,021						
1905.....				103,278	152,334						
1906.....				136,022	164,146						
1907.....				125,459	252,437						
1908.....				87,566	253,790						
1909.....				145,516	296,333						
1910.....				160,850	293,929						
1911.....				226,958	347,248						
1912.....				332,943	368,135						
1913.....				180,820	358,192						
1914.....				98,349	374,245						
1915.....				44,406	365,246						
1916.....				78,668	441,836						
1917.....				78,251	662,451						
1918.....				133,935	722,148						
1919.....				270,989	819,390						
1920.....				471,448	797,828						
1921.....				166,244	823,180						
1922.....				134,704	802,053						
1923.....				119,405	858,448						
1924.....				137,280	886,668						
1925.....				95,952	870,875						
1926.....				214,113	819,805						
1927.....				311,240	868,867						
1928.....				377,896	831,491						
1929.....				502,522	993,226						
1930.....				349,283	968,863						
1931.....				166,257	945,259						
1932.....				109,739	1,229,449			11	258		
1933.....				92,207	1,285,996	3,223,941	240,338	5,400	154,440		
1934.....				90,997	1,241,130	6,618,913	491,077	5,405	186,472	13,781	4,823
1935.....				98,150	1,293,668	11,429,452	890,974	14,323	504,026	75,558	7,555
1936.....	111,749	99,457	95,584	1,020,792	1,463,680	14,971,609	1,418,859	48,981	1,715,805	90,839	33,985
1937.....	144,553	237,067	115,330	1,049,348	1,494,337	22,436,843	2,934,290	65,886	2,305,351	100,380	35,130
1938.....	73,630	59,166	118,713	1,022,166	1,380,416	18,156,157	1,810,532	50,021	1,759,489	90,285	34,136
1939.....	66,608	46,939	148,774	959,595	1,255,142	18,133,149	1,829,997	77,120	2,787,194	96,423	36,640
1940.....	71,594	83,264	164,828	1,097,517	1,408,540	20,484,954	2,066,112	102,925	3,962,613	100,773	30,232
1941.....	108,832	127,769	224,897	1,323,763	1,713,478	32,324,512	3,260,250	138,015	5,313,578	106,168	31,850
1942.....	147,314	173,831	271,325	1,301,116	1,760,065	56,781,466	5,726,979	178,871	6,886,533	117,124	45,585
Total.....	724,280	827,493	6,872,359	20,971,578	32,673,413	204,560,996	20,669,408	686,958	25,575,759	791,331	259,936

* For the years 1919-1942 the tonnage shown is the total output from all mines; for previous years the figures given include only sales, colliery consumption, and coal used by the operators.

(a) See Manitoba.

(b) Includes production from Alberta 1886-1892.

(c) Includes a small quantity from Manitoba.

(d) From Turtle Mountain district, Manitoba.

NOTE.—In 1907 there were produced 3,700 bush. of lime valued at \$1,480; in 1912, 4,000 bush. valued at \$1,440; and in 1913, 35,000 valued at \$10,000.

In 1920 there were produced 2 tons magnesium sulphate, valued at \$103; and in 1921, 2 tons valued at \$120.

(e) Complete data relating to recovery of placer gold are not available.

Table 12.—Historical Summary of the Mineral Production of Saskatchewan
—Concluded

	Quartz*		Salt		Sand and Gravel		Selenium		Silver		Sodium Sulphate	
	Tons	\$	Tons	\$	Tons	\$	Pounds	\$	Fine oz.	\$	Tons	\$
1911.												
1912.						255,453						
1913.						236,377						
1914.						222,019						
1915.					111,919	38,206						
1916.					328,116	60,079						
1917.					943,970	112,275						
1918.												
1919.											15	450
1920.											811	19,496
1921.			33	790							623	18,850
1922.					924,944	306,733					504	11,980
1923.					438,319	59,541					733	10,189
1924.					702,713	97,045					1,083	6,004
1925.					579,901	88,805					3,876	19,380
1926.					863,901	145,296					6,775	13,550
1927.					1,517,801	263,100					5,659	11,319
1928.					2,225,524	431,475					6,016	68,804
1929.					3,496,679	687,646					5,018	64,112
1930.					3,680,553	751,779					31,571	293,847
1931.					1,388,594	396,707					44,957	421,097
1932.					362,841	66,942			14	4	22,466	271,736
1933.	59,506	59,506	231	4,510	104,400	19,731			114,604	43,358	50,080	485,416
1934.	92,447	88,748	452	8,703	533,575	169,033	459	689	87,551	41,552	66,821	587,986
1935.	77,177	59,069	101	2,046	502,732	171,170	19,567	37,569	201,608	130,622	44,817	343,764
1936.	76,089	49,458			716,910	284,531	25,380	44,928	642,497	289,940	75,598	552,681
1937.	95,809	33,533			822,447	470,343	28,080	48,578	821,818	368,840	79,804	617,548
1938.	116,898	40,914			1,037,753	662,511	28,612	49,642	895,413	390,603	62,920	552,180
1939.	134,192	46,967			1,913,995	408,199	(a)	(a)	1,141,600	462,211	71,455	627,965
1940.	159,090	55,681			1,472,885	741,353	(a)	(a)	1,691,540	646,997	94,250	829,539
1941.	148,208	51,873			1,220,801	406,835	29,091	55,564	2,047,164	783,266	115,600	931,522
1942.	155,699	54,495			679,979	435,798	71,952	138,148	2,664,132	1,123,358	131,258	1,079,692
Total	1,115,115	540,244				7,988,982	203,141	375,113	10,310,941	4,280,751	922,719	7,889,107

*Low grade silica sand for fluxing purposes.

(a) No commercial recovery reported by smelter; sometimes recovered by copper refiner but presumably not paid for

	Tellurium		Volcanic Dust		Zinc		Other Products
	pounds	\$	tons	\$	pounds	\$	\$
1908.							(a) 71,856
1909.							(a) 15,591
1910.							(a) 43,349
1911.							(a) 64,700
1912.							
1913.							
1914.							
1915.							
1916.							
1917.							
1918.							158,572
1919.							415,402
1920.							491,718
1921.							105,036
1922.							
1923.							
1924.				245	1,103		
1925.				160	1,380		
1926.				90	630		
1927.				105	735		
1928.				485	9,795		
1929.				300	6,000		
1930.				242	4,840		
1931.				128	2,560		
1932.				180	3,600		
1933.				118	2,360	2,789,683	89,563
1934.				1	20	2,162,938	65,831
1935.	102	204			8,074,720	278,126	
1936.	1,964	3,476			27,692,869	918,019	
1937.	3,276	5,667			32,750,910	1,605,449	
1938.	2,206	3,794			29,062,597	920,751	
1939.	(c)	(c)			37,278,001	1,144,062	
1940.	(c)	(c)			44,452,595	1,516,278	(b) 165
1941.	(c)	(c)			62,142,288	2,119,673	
1942.	1,223	1,957			84,461,520	2,880,983	
Total	8,771	15,098	2,054	33,023	332,668,121	11,538,735	1,366,359

(a) Includes sand-lime brick, etc.

(b) 33 tons grinding pebbles valued at \$165 in 1940.

(c) No commercial recovery reported by smelter; sometimes recovered by copper refiner but presumably not paid for.

Table 12.—Historical Summary of the Mineral Production of Alberta

	Bituminous Sands		Cement		Clay Products	Coal*		Gold		Lime	
	tons	\$	barrels.	\$	\$	tons	\$	fine oz.	\$	bushels	\$
1886						43,220	81,112				
1887						74,152	157,577	102	2,100		
1888						115,124	183,354	58	1,200		
1889						97,394	179,640	967	20,000		
1890						128,753	198,298	193	4,000		
1891						174,131	437,243	266	5,500		
1892						178,970	460,605	508	10,506		
1893						230,070	586,260	466	9,640		
1894						184,940	473,827	726	15,000		
1895						169,885	382,526	2,419	50,000		
1896						209,162	581,832	2,661	55,000		
1897						242,163	630,408	2,419	50,000		
1898						315,088	787,720	1,209	25,000		
1899						309,600	774,000	726	15,000		
1900						311,450	778,625	242	5,000		
1901						340,275	850,687	726	15,000		
1902						402,819	960,601	484	10,000		
1903						495,893	1,117,541	48	1,000		
1904						661,732	1,404,524	24	500		
1905					191,287	931,917	1,993,915	121	2,500		
1906					180,217	1,246,360	2,614,762	39	800	240,000	56,200
1907					353,872	1,591,579	3,836,286	33	675	173,040	41,225
1908					240,384	1,685,661	4,127,311	50	1,037	135,000	34,500
1909					442,486	1,994,741	4,838,109	25	525	281,125	67,350
1910		323,009	774,473	753,232	2,894,469	7,065,736	89	1,850	303,214	69,268	
1911		152,176	1,241,535	1,052,751	1,511,036	3,979,264	10	207	434,038	100,407	
1912		821,165	1,775,898	1,356,184	3,240,577	8,113,525	73	1,509	704,035	166,520	
1913		956,169	1,947,933	893,408	4,014,755	10,418,941			465,250	115,355	
1914		641,395	1,212,342	462,199	3,683,015	9,350,392	48	992	280,252	58,321	
1915		233,648	415,009	115,696	3,360,818	8,283,079	195	4,026	74,152	14,445	
1916		275,727	477,832	225,140	4,559,054	11,386,577	82	1,695	78,019	20,033	
1917		259,423	567,969	309,991	4,736,368	14,153,685			104,540	35,516	
1918		200,401	523,672	381,074	5,972,816	20,537,287	27	558	80,408	44,141	
1919		(c)	(c)	571,949	4,933,660	18,205,205	24	500	109,067	41,276	
1920		(c)	(c)	786,430	6,907,765	30,186,933			139,433	72,477	
1921		(c)	(c)	710,477	5,909,217	27,246,514	49	1,013	107,083	48,332	
1922		358,209	838,208	700,063	5,990,911	24,351,913			130,627	71,328	
1923		318,756	740,940	590,565	6,854,397	28,018,303			87,753	37,999	
1924	531	2,127	416,534	945,700	540,477	5,189,729	18,884,318			90,214	36,279
1925	1,148	4,594	395,857	913,529	618,860	5,869,031	20,021,484			98,938	39,852
1926	528	2,112	423,766	873,621	804,933	6,503,705	20,886,103			108,309	39,517
1927	2,706	10,824	601,699	1,303,880	889,358	6,934,162	21,982,058	42	868	130,596	46,947
1928	94	374	834,067	1,732,582	1,162,264	7,336,330	25,532,414	68	1,496	190,629	69,588
1929	989	3,956	808,796	1,770,785	1,242,427	7,150,693	22,928,182	5	103	219,457	79,569
1930	2,067	8,268	525,289	1,144,160	997,685	5,755,528	18,063,225			146,743	49,525
1931	1,015	4,060	626,483	1,286,080	529,716	4,564,015	13,342,675	195	4,205	146,229	46,785
1932	343	1,372	193,571	399,922	329,584	4,870,648	13,526,309	83	1,949	180,771	56,577
1933	466	1,662	149,206	299,530	198,373	4,718,788	12,307,258	324	9,267	214,314	62,037
1934	862	3,449	163,946	325,253	246,677	4,753,810	12,556,099	393	13,558	213,000	65,697
1935	40	160	219,555	436,914	326,679	5,462,894	14,094,795	150	5,279	188,114	57,108
1936			243,534	482,197	315,777	5,696,960	14,659,705	109	3,818	260,829	78,259
1937	35	142	267,106	531,541	338,638	5,562,339	14,563,911	46	1,610	304,314	93,478
1938	(d)	(d)	304,373	611,790	377,337	5,251,233	13,698,470	305	10,728	344,371	107,012
1939	(d)	(d)	377,846	744,357	461,079	5,519,208	14,415,281	359	12,974	357,115	108,632
1940	(d)	(d)	414,183	832,508	538,856	6,203,839	16,377,959	215	8,277	482,057	149,720
1941	(d)	(d)	492,515	985,030	952,144	6,960,962	19,382,471	215	8,277	512,857	151,296
1942	(d)	(d)	688,043	1,307,353	1,013,497	7,754,053	22,624,410	34	1,309	537,743	155,760
Total					22,601,566	188,771,334	579,581,244	17,652	395,961	8,662,636	2,588,331

(c) Included in other products.

(d) Now included under petroleum.

* For the year 1919-1942 the tonnage shown is the total output for all mines; for previous years the figures recorded include only sales, colliery consumption and coal used by operators.

Table 12.—Historical Summary of the Mineral Production of Alberta—Continued

	Natural Gas		Petroleum		Salt		Sand and Gravel		Silver*	
	M cu. ft.	\$	barrels.	\$	tons	\$	tons	\$	fine oz.	\$
1903.....		5,675								
1904.....		74,852								
1905.....		63,085								
1906.....		50,077								
1907.....		68,533								
1908.....		63,363								
1909.....		61,722								
1910.....		75,168								
1911.....		110,165								
1912.....		289,906							148,704	
1913.....	7,174,490	1,079,466							265,165	
1914.....	7,172,157	1,214,670	387	2,200					273,115	
1915.....	4,481,947	1,022,814	(a)	(a)			390,617		47,197	
1916.....	6,904,231	1,113,296	(a)	(a)			467,500		67,142	
1917.....	6,744,130	1,299,976	8,500	63,302			709,745		71,216	
1918.....	6,318,389	1,358,638	13,040	100,004			(b)		(b)	
1919.....	8,230,838	1,365,127	16,437	97,841			(b)		(b)	
1920.....	5,633,442	1,181,345	11,032	75,986			(b)		(b)	
1921.....	4,945,884	1,374,599	7,203	49,313			(b)		(b)	
1922.....	5,868,439	1,622,105	6,559	52,128			1,139,961		221,091	
1923.....	7,191,670	1,692,246	1,943	8,227			888,216		199,256	
1924.....	7,131,086	1,796,618	844	4,135			615,594		115,969	
1925.....	9,119,500	2,752,545	183,491	845,394			534,892		107,436	
1926.....	10,794,697	3,019,221	216,050	902,504	833	8,304	1,754,965		412,430	
1927.....	13,434,621	3,586,533	318,741	1,185,948	2,037	22,696	1,392,752		293,674	4
1928.....	14,288,005	3,754,466	482,047	1,764,172	100	1,300	2,575,708		489,406	7
1929.....	19,112,931	4,684,247	988,675	3,458,177			1,721,930		447,993	
1930.....	20,748,583	4,929,226	1,398,160	4,780,696			1,626,989		433,221	
1931.....	17,798,698	4,067,893	1,413,631	3,976,220			1,050,988		313,616	29
1932.....	15,370,968	3,853,794	906,751	2,751,541			734,067		250,025	9
1933.....	15,352,811	3,886,263	995,832	2,844,157			281,122		85,577	3
1934.....	14,841,491	3,707,276	1,253,966	3,104,823			650,232		196,898	12
1935.....	16,060,349	4,113,436	1,263,510	3,102,227			653,511		146,092	35
1936.....	17,407,820	4,376,720	1,312,368	3,019,830			894,380		339,928	16
1937.....	20,955,506	4,766,437	2,749,085	4,961,002			711,966		312,687	9
1938.....	21,822,108	4,807,346	6,751,312	8,775,094						4
1939.....	22,513,660	4,915,821	7,576,932	9,362,363	4,045	46,035	792,760		525,175	2
1940.....	27,459,808	4,923,469	8,362,208	10,694,394	3,319	37,526	817,168		619,105	10
1941.....	30,905,440	5,175,364	9,918,577	13,985,906	6,742	185,430	1,722,465		1,069,667	23
1942.....	34,482,585	6,146,146	10,117,073	15,514,665	16,617	260,995	956,484		433,504	8
					22,360	335,960	481,644		218,914	1
Total.....		94,449,649	56,274,349	95,482,349	56,053	898,246				

* Data not available prior to 1927.

(a) Small output but no record.

(b) Included with other products.

Table 12.—Historical Summary of the Mineral Production of Alberta—Concluded

	Sodium Sulphate		Limestone		Sandstone		Other Products
	tons	\$	tons	\$	tons	\$	\$
1908.....							(d) 690,410
1909.....						90,383	(c) 614,222
1910.....						240,858	(b) 84,893
1911.....						158,344	
1912.....						81,391	
1913.....				20,000		136,984	
1914.....						60,272	2,200
1915.....						890	
1916.....				257			
1917.....				672		6,810	† 2,695
1918.....			(a)	(a)	(a)	(a)	152,444
1919.....			(a)	(a)	(a)	(a)	702,999
1920.....			(a)	(a)	(a)	(a)	1,575,569
1921.....					2,962	13,750	1,118,231
1922.....					554	7,300	
1923.....							
1924.....			16,418	16,762	280	2,555	
1925.....			3,979	6,868			
1926.....			3,545	5,826	214	8,064	
1927.....			3,367	7,830			
1928.....			4,852	15,240	158	9,500	
1929.....			4,975	12,046	208	12,500	
1930.....			7,786	17,236	117	4,500	
1931.....			2,429	5,842	67	3,800	
1932.....			1,428	2,985			
1933.....			1,472	4,317	78	4,500	
1934.....			2,737	8,104			
1935.....			2,242	6,981			
1936.....			13,876	26,188	40	3,200	
1937.....	80	480	13,182	24,935	43	2,254	
1938.....	89	1,127	1,691	6,148			
1939.....	30	186	2,888	8,166	155	5,314	(e) 800
1940.....	10	50	3,981	11,999			
1941.....	8	32	7,942	24,303			(f) 5,055
1942.....			12,028	40,436			(f) 1,380
Total.....							4,950,898

† Includes a small value for copper, zinc and silver.

(a) Data by kinds not available; total values of all kinds of stone produced were: 1918-\$569; 1919-\$3,189; 1920-\$4,415.

(b) Includes lime and sand-lime brick.

(c) Includes cement, lime, etc.

(d) Includes cement, lime, stone, etc.

(e) Marble: 1939-5 tons valued at \$800.

(f) Peat moss: 1942-58 tons valued at \$1,380; 1941-421 tons at \$5,055. In previous years included under manufacture.

Table 12.—Historical Summary of the Mineral Production of British Columbia

—	Arsenic		Bismuth		Cadmium		Cement		Chromite		Clay Products
	lb.	\$	lb.	\$	lb.	\$	barrels	\$	tons	\$	\$
1886											41,150
1887											19,480
1888											42,532
1889											62,317
1890											67,201
1891											79,475
1892											129,234
1893											*
1894											*
1895											*
1896											*
1897											*
1898											100,000
1899											109,000
1900											105,000
1901											101,996
1902											76,313
1903											152,748
1904											158,874
1905											98,886
1906											123,277
1907											306,137
1908											344,446
1909											470,402
1910											562,360
1911							401,000	601,500			675,505
1912							511,539	767,038			996,568
1913							574,258	980,560			684,904
1914							491,151	833,606			413,909
1915							309,436	526,042			229,763
1916							285,679	436,459			292,698
1917	260,000	11,200					207,587	438,009			334,685
1918	2,156,000	43,114					106,415	283,497	670	31,395	357,921
1919	1,060,000	21,218					†				293,478
1920	1,256,000	22,231					†				596,172
1921							†				415,869
1922	1,036,000	21,097					391,090	1,173,270			447,452
1923	1,217,970	41,780					795,637	1,302,482			426,138
1924	495,250	19,768					472,327	1,240,331			460,594
1925	1,277,696	16,978					485,185	1,151,344			523,931
1926	1,019,200	11,262					544,863	1,239,018			592,495
1927	1,231,790	13,611					523,931	1,182,552			679,788
1928	1,334,997	14,903			491,894	341,374	670,796	1,495,204			706,039
1929	1,487,175	16,433	166,883	283,701	773,976	675,294	680,907	1,487,223	126	900	866,427
1930	1,773,333	19,595			456,582	337,871	721,044	1,489,235			687,516
1931			110,876	154,118	323,139	180,958	578,636	1,172,549			498,505
1932			57	65,425	51	26,824	253,112	536,528			216,355
1933			70,723	77,795	246,041	78,733	115,286	225,342			174,205
1934			246,092	297,771	293,611	95,665	122,345	232,009			194,437
1935			6,718	6,449	580,530	441,203	167,226	314,116			216,636
1936			360,613	357,007	526,034	468,170	281,549	516,931			280,891
1937					436,431	715,747	344,072	623,725			349,640
1938					510,342	410,090	335,488	626,731			365,132
1939			409,449	466,362	799,253	563,241	272,679	520,420			371,140
1940			40,740	56,384	778,791	905,734	363,366	704,567			520,883
1941			12	17	1,081,374	1,269,533	501,945	998,322			558,426
1942	(a)7,114,751	71,148	345,223	476,408	972,413	1,147,447	571,945	1,198,014			560,746
Total	22,720,162	344,333	1,757,386	2,176,063	8,335,836	7,657,884	12,080,494	24,284,622	796	32,295	18,139,676

(a) Arsenic content of gold ores exported; arsenic content not paid for.

* Data not available by provinces.

† Included with other products.

Table 12.—Historical Summary of the Mineral Production of British Columbia
—Continued

	Coal (a)		Copper		Diatomite		Fluorspar		Gold	
	tons	\$	lb.	\$	tons	\$	tons	\$	fine oz.	\$
1858.									34, 04	705, 000
1859.									78, 129	1, 615, 072
1860.									107, 806	2, 228, 543
1861.									128, 973	2, 666, 118
1862.									128, 528	2, 656, 903
1863.									189, 318	3, 913, 563
1864.									180, 722	3, 735, 850
1865.									168, 887	3, 491, 205
1866.	(b) 214, 410	765, 748							128, 779	2, 682, 106
1867.	34, 988	124, 956							120, 012	2, 480, 868
1868.	49, 286	176, 020							114, 792	2, 372, 972
1869.	40, 098	143, 208							85, 865	1, 774, 978
1870.	33, 424	119, 372							64, 675	1, 336, 958
1871.									87, 048	1, 799, 440
1872.	166, 274	593, 836							77, 931	1, 610, 972
1873.									63, 166	1, 305, 749
1874.	90, 788	243, 183							89, 233	1, 844, 618
1875.	109, 361	292, 932							119, 724	2, 474, 904
1876.	157, 007	420, 555							86, 429	1, 786, 648
1877.	156, 455	419, 076							77, 796	1, 608, 182
1878.	213, 750	572, 544							61, 688	1, 275, 204
1879.	260, 277	697, 170							62, 407	1, 290, 058
1880.	305, 045	817, 086							49, 044	1, 013, 827
1881.	257, 050	688, 542							50, 636	1, 046, 737
1882.	323, 201	865, 716							46, 154	954, 085
1883.	240, 075	643, 059							38, 422	784, 252
1884.	441, 130	1, 181, 598							35, 012	736, 105
1885.	372, 987	999, 072							34, 527	713, 738
1886.	375, 415	1, 005, 576							43, 714	903, 651
1887.	486, 142	1, 302, 165							33, 558	693, 709
1888.	539, 467	1, 445, 001							29, 884	616, 731
1889.	636, 439	1, 704, 747							28, 489	588, 923
1890.	767, 586	2, 056, 035							23, 918	494, 436
1891.	1, 130, 227	3, 027, 528							20, 792	429, 811
1892.	987, 218	2, 610, 406							19, 327	399, 525
1893.	1, 093, 980	2, 930, 304							18, 360	379, 555
1894.	1, 112, 628	2, 980, 254	*324, 680	31, 039					25, 064	530, 530
1895.	1, 058, 445	2, 834, 049	*952, 840	102, 526					61, 289	1, 266, 954
1896.	1, 003, 769	2, 688, 666	*3, 818, 556	415, 459					86, 504	1, 788, 206
1897.	1, 019, 390	2, 730, 510	*5, 325, 180	601, 213					131, 805	2, 724, 657
1898.	1, 263, 680	3, 384, 858	*7, 271, 678	874, 783					142, 215	2, 939, 852
1899.	1, 481, 101	3, 833, 307	*7, 722, 591	1, 359, 948					203, 295	4, 202, 473
1900.	1, 791, 833	4, 799, 553	*9, 977, 080	1, 615, 289					228, 916	4, 732, 105
1901.	1, 919, 488	5, 141, 487	*27, 603, 746	4, 448, 896					267, 282	5, 318, 703
1902.	1, 808, 441	4, 844, 040	*39, 359, 921	3, 445, 488					288, 368	5, 961, 409
1903.	1, 676, 581	4, 490, 844	*35, 710, 128	4, 547, 735					275, 975	5, 873, 036
1904.	1, 862, 625	4, 989, 174	*37, 692, 251	4, 579, 110					285, 529	5, 704, 908
1905.	1, 945, 452	5, 211, 030	*42, 990, 488	5, 876, 222					269, 888	5, 579, 039
1906.	2, 146, 262	5, 748, 915	*40, 832, 720	8, 287, 706					236, 216	4, 883, 020
1907.	2, 364, 898	7, 390, 306	37, 041, 115	4, 892, 390					236, 588	5, 029, 880
1908.	2, 333, 708	7, 292, 838	35, 658, 952	4, 629, 245					200, 320	5, 174, 579
1909.	2, 606, 127	8, 144, 147	35, 270, 096	4, 492, 693					261, 386	5, 403, 318
1910.	3, 330, 745	10, 408, 830	35, 279, 558	4, 366, 198					238, 496	4, 930, 145
1911.	2, 542, 532	7, 945, 413	50, 526, 656	8, 256, 561					251, 815	5, 205, 485
1912.	3, 208, 997	10, 028, 116	45, 791, 579	6, 991, 916					297, 459	6, 140, 027
1913.	2, 714, 420	8, 482, 562	41, 219, 202	5, 606, 636					252, 730	5, 224, 393
1914.	2, 239, 799	6, 999, 374	56, 692, 988	7, 963, 959					219, 633	4, 540, 216
1915.	2, 065, 613	6, 455, 041	62, 865, 631	8, 317, 884					133, 742	2, 764, 693
1916.	2, 584, 061	8, 075, 190	45, 730, 959	15, 482, 560					175	5, 250
1917.	4, 433, 888	12, 235, 716	44, 502, 079	8, 317, 884					1, 638	38, 556
1918.	2, 568, 589	11, 494, 681	45, 319, 771	7, 911, 019					7, 477	171, 971
1919.	2, 649, 516	13, 512, 832	34, 447, 127	4, 306, 580					5, 403	134, 523
1920.	3, 085, 011	13, 105, 814	31, 936, 182	4, 273, 700					4, 219	98, 233
1921.	2, 890, 291	16, 676, 774	55, 224, 737	7, 963, 959					75	1, 135
1922.	2, 927, 033	14, 622, 317	65, 451, 246	8, 524, 370					3, 874	19, 034
1923.	2, 823, 306	13, 813, 820	69, 221, 600	9, 720, 097						
1924.	2, 193, 667	10, 601, 998	89, 108, 017	12, 292, 450						
1925.	2, 742, 252	11, 720, 373	101, 686, 297	11, 845, 870						
1926.	2, 713, 719	10, 612, 915	102, 283, 210	14, 902, 664						
1927.	2, 646, 234	10, 934, 777	103, 093, 738	18, 772, 778	160	4, 800				
1928.	2, 804, 594	11, 094, 353	93, 318, 885	12, 114, 657	146	5, 147				
1929.	2, 490, 789	10, 160, 789	65, 223, 345	5, 459, 194	66	2, 270				
1930.	2, 083, 818	8, 421, 572	50, 186, 104	3, 227, 111	47	440				
1931.	1, 876, 406	7, 150, 996	43, 146, 724	3, 216, 502	14	410				
1932.	1, 681, 490	6, 392, 801	48, 246, 924	3, 579, 583	6	190				
1933.	1, 382, 272	5, 306, 287	38, 478, 043	2, 999, 525	57	1, 880				
1934.	1, 485, 969	5, 351, 108	21, 169, 343	2, 006, 219	10	350				
1935.	1, 331, 287	5, 043, 510	65, 739, 265	6, 557, 514	14	362				
1936.	1, 459, 171	5, 493, 425	73, 253, 408	7, 392, 734	17	447				
1937.	1, 598, 843	5, 863, 849	66, 327, 166	6, 689, 758	105	2, 625				
1938.	1, 440, 287	5, 237, 077	50, 015, 521	5, 044, 565	147	2, 547				
1939.	1, 537, 905	5, 464, 061								
1940.	1, 867, 846	6, 157, 250								
1941.	2, 020, 844	6, 492, 672								
1942.	2, 168, 541	7, 566, 822								
Total.	112, 405, 447	401, 171, 678	2, 278, 080, 467	322, 818, 136	1, 095	28, 235	42, 220	761, 200	15, 566, 706	396, 684, 362

NOTE.—In 1928 1, 730 pounds of cobalt were produced, valued at \$420.

*Metal content of ores shipped as published by British Columbia Department of Mines.

(a) The tonnage shown for 1919-1942 inclusive, is the total output from all mines. For previous years the figures include only sales, colliery consumption and coal used by operators.

(b) 1836-1866 inclusive.

Table 12.—Historical Summary of the Mineral Production of British Columbia
—Continued

—	Gypsum		Iron Ore		Iron Oxides		Lead		Lime		Magnesium Sulphate	
	tons	\$	tons	\$	tons	\$	lb.	\$	bushels	\$	tons	\$
1886.			3,941						4,000	2,500		
1887.			2,796				204,800	9,216	10,080	2,688		
1888.			8,372				674,500	29,813	13,000	3,900		
1889.			15,487				165,100	6,488	60,000	15,200		
1890.									30,000	8,000		
1891.			950									
1892.			2,300				808,420	33,064				
1893.			1,325				2,131,092	79,490				
1894.			1,120				5,703,222	187,636				
1895.			1,222				16,461,794	531,716				
1896.			196				24,199,977	721,159				
1897.			2,099				38,841,135	1,390,513				
1898.			280				31,693,559	1,198,017				
1899.			2,071				21,862,436	977,250				
1900.			1,110				63,158,621	2,760,031				
1901.			7,000				51,582,906	2,235,603				
1902.			10,019				22,536,381	917,005				
1903.			2,290				18,089,283	766,443				
1904.							36,646,244	1,579,086				
1905.							56,580,703	2,663,254				
1906.							52,408,217	2,964,733	106,192	26,694		
1907.			2,500				47,738,703	2,542,086	159,963	49,847		
1908.							43,195,733	1,814,221	176,435	44,027		
1909.							45,857,424	1,692,139	231,269	75,076		
1910.							32,987,508	1,216,249	196,878	72,657		
1911.	780	1,875					23,784,969	827,717	351,014	117,756		
1912.							35,763,476	1,597,554	517,329	181,905		
1913.	200	1,300					37,626,899	1,753,037	362,571	115,365		
1914.							36,289,845	1,625,422	151,689	56,767		
1915.							45,377,064	2,541,116	152,237	49,725		
1916.							39,157,701	3,333,496	194,042	66,301		
1917.	10	20					29,483,725	3,283,602	232,955	58,067	929	4,645
1918.			2,200	6,600			47,594,328	4,402,475	401,562	143,697	1,949	14,565
1919.			1,200				40,060,113	2,790,587	351,253	187,963	738	9,115
1920.			1,212	7,272			32,792,725	2,931,670	561,305	341,632	1,947	39,886
1921.	40	100	1,010	3,030	169	845	60,298,603	3,462,346	199,341	252,630	2,029	39,506
1922.	100	500	1,255	3,528	3	120	87,093,266	5,430,265	516,830	284,641	1,021	24,017
1923.	323	1,615	243	1,215	513	6,450	99,541,818	7,146,107	690,971	388,494	121	6,580
1924.	30	150	28		120	2,620	168,467,628	13,652,617	636,348	370,829		
1925.	240	865			133	2,740	242,454,502	22,111,850	649,858	364,435		
1926.	20,916	156,964			108	920	266,812,461	18,012,509	728,633	416,882		
1927.	24,493	201,754			194	1,350	292,770,544	15,388,020	688,890	376,683		
1928.	20,982	229,843			136	1,815	317,722,146	14,537,377	1,004,257	473,996		
1929.	24,696	243,814			298	2,000	307,999,153	15,555,189	1,131,171	510,592		
1930.	32,128	248,458			6	120	321,803,725	12,637,232	1,043,343	335,057		
1931.	20,544	176,173			110	1,000	261,902,236	7,097,812	852,171	277,269		
1932.	10,728	84,084			223	2,000	252,007,574	5,326,432	490,057	160,001		
1933.	5,107	46,004			165	1,485	263,345,776	6,298,178	591,914	162,928	120	3,360
1934.	9,661	48,081			161	1,600	344,467,138	8,392,597	562,486	153,856	42	1,100
1935.	7,618	52,335			159	1,687	336,784,326	10,552,059	457,257	99,960	340	7,965
1936.	14,078	77,258			396	4,000	376,645,367	14,738,133	690,257	134,785	654	13,712
1937.	15,764	108,478			580	6,000	403,589,913	20,623,445	792,543	154,037	727	14,456
1938.	17,451	100,080			434	4,560	413,706,307	13,834,339	561,571	174,161	470	9,400
1939.	18,150	100,641			550	5,917	378,440,666	11,992,784	652,886	197,259	550	9,900
1940.	19,987	120,043			376	3,948	466,849,112	15,695,467	811,086	234,534		
1941.	23,862	141,320			275	2,884	456,840,454	15,358,976	1,014,343	244,051	265	7,343
1942.	23,313	146,154			438	4,604	507,199,704	17,052,054	886,686	236,904	1,140	38,760
Total	311,201	2,287,909			5,547	58,665	7,608,201,022	326,297,676	19,916,673	7,623,751	13,042	244,310

NOTE.—There was a production of 803 tons of magnesite, valued at \$7,211 in 1921; and in 1916, 635 tons, valued at \$9,525. Also in 1941, 10,905 pounds of magnesium metal in powder form were produced from B.C. magnesite, at Trail, valued at \$2,944; the corresponding output in 1942 was 193,727 pounds at \$85,240.

Table 12.—Historical Summary of the Mineral Production of British Columbia
—Continued

	Antimony		Manganese Bog		Mercury (a)		Mica*		Mineral Waters	Natro-Alunite		Phosphate	
	lb.	\$	tons	\$	lb.	\$	lb.	\$	\$	tons	\$	tons	\$
1895.....					71	2,343							
1896.....					58	1,940							
1897.....					9	324							
1907.....	63,850	5,108			flasks(a)								
1909.....	61,207	4,285											
1910.....									4,000				
1911.....									3,500				
1912.....									4,200				
1913.....									4,800				
1914.....									2,330				
1915.....									1,400				
1916.....		13,003							1,250				
1917.....									1,382				
1918.....			440	6,230					1,455				
1919.....			616	10,559					1,800				
1920.....			587	6,889									
1921.....										30	1,500		
1922.....										50	2,500		
1923.....										15	750		
1924.....													
1925.....										20	1,000		
1926.....													
1927.....										7	248	38	494
1928.....												550	7,150
1929.....			1	30								1,145	4,580
1930.....													
1931.....													
1932.....													
1933.....							46,000	853				2,109	4,670
1934.....							114,000	2,045					
1935.....													
1936.....													
1937.....													
1938.....					760	760	96,250	1,562					
1939.....	1,224,385	151,321			436	1,226	(b)	(b)					
1940.....	2,594,492	396,468			153,830	369,317	160,000	2,600					
1941.....	3,185,077	445,911			536,304	1,335,697	296,000	3,678					
1942.....	3,041,030	516,975			1,035,914	2,943,807	562,000	9,061					
Total..			1,644	23,708		4,655,414	1,274,250	19,799	26,117	122	5,998	3,842	16,994

(a) 1895-1897—recorded as flasks, 1937 to 1906 no production; 1908—no production. (b) Not published.

* 1899—Production valued at \$525 included in Dominion total as Ontario and Quebec.

NOTE.—1937—Nickel production valued at \$37,753; and in 1936 a relatively small tonnage of nickel ore exported; no data available.

1918—Molybdenite production of 1,600 pounds, valued at \$1,840; 1917—3,705 pounds, valued at \$3,705 and in 1916 production valued at \$13,003, including antimony. In 1942 there were 4,887 pounds of molybdenite concentrates valued at \$2,907 shipped to the Quyon plant, Quebec, from an old stock pile in Renfrew county, Ontario.

Table 12.—Historical Summary of the Mineral Production of British Columbia
—Continued

	Platinum		Other Platinum Metals (Palladium, Rhodium, etc.)		Quartz		Sand and gravel		Silver		Sodium Carbonate	
	fine oz.	\$	fine oz.	\$	tons	\$	tons	\$	fine oz.	\$	tons	\$
1887		5,600							17,690	17,301		
1888		6,000							79,780	74,993		
1889		3,500							53,192	49,787		
1890		4,500							70,427	73,666		
1891		10,000							3,306	3,266		
1892		3,500							77,160	67,592		
1893		1,800								195,000		
1894		950							746,379	470,219		
1895		3,800							1,496,522	976,930		
1896		750							3,135,343	2,102,561		
1897		1,600							5,472,971	3,272,289		
1898		1,500							4,292,401	2,500,753		
1899		825							2,939,413	1,751,802		
1900									3,958,175	2,427,548		
1901		457							5,151,333	3,036,711		
1902		190							3,917,917	2,043,586		
1903									2,996,204	1,601,471		
1904		420							3,222,481	1,843,035		
1905		500							3,439,417	2,075,757		
1906									2,990,262	1,997,226		
1907									2,745,448	1,793,519		
1908									2,631,389	1,391,058		
1909									2,649,141	1,364,387		
1910									2,407,887	1,287,883		
1911									1,887,147	1,005,924		
1912									385,946	2,651,002		
1913	18	489							180,863	3,312,343		
1914									391,731	3,159,897		
1915	23	1,063			30,559	61,118	868,240	256,454	3,565,852	1,771,658		
1916	15	600			41,077	82,154	578,424	230,197	3,392,872	2,227,794		
1917	57	3,823			37,755	132,143			2,655,994	2,162,430		
1918	39	2,560			49,886	149,658			3,921,336	3,794,755		
1919	25	2,150			32,715	340,313			3,713,537	4,126,556		
1920	17	719			35,876	141,200			3,327,028	3,356,971		
1921	23	1,726			22,288	62,317			3,350,357	2,099,133	197	14,775
1922	12	1,154			17,425	37,521	960,251	304,071	7,150,937	4,828,384	202	3,027
1923	7	816			25,590	47,029	434,194	266,119	6,113,327	3,965,899	265	3,975
1924	5	569			21,358	43,034	1,105,459	344,937	8,153,003	5,444,657	510	5,173
1925	6	715			853	2,262	1,415,232	446,896	8,579,458	5,925,403	1,120	8,140
1926	50	4,258			6,466	77,060	1,486,254	357,985	10,625,816	6,599,376	595	5,370
1927	11	960			20,859	80,824	1,379,143	342,021	11,040,445	6,223,499	805	9,995
1928	80	4,549	520	22,270	16,017	43,876	2,334,270	529,669	10,943,367	6,366,413	519	4,922
1929	45	2,828	177	6,836	9,642	45,947	2,425,996	665,132	10,156,408	5,382,185	600	8,100
1930	24	1,089	52	1,356	1,095	5,291	2,494,743	819,739	11,825,930	4,512,065	364	4,550
1931	50	1,783			519	1,297	2,726,704	914,322	8,061,599	2,408,000	712	7,351
1932	59	2,372			15,621	8,435	1,487,513	525,604	7,293,462	2,309,958	495	5,450
1933	40	1,400			22,668	17,681	961,672	332,962	6,737,057	2,548,817	559	5,773
1934	53	2,051			24,847	13,990	958,149	335,142	8,729,721	4,143,204	244	1,920
1935	39	1,275			11,056	4,771	1,381,720	481,620	9,178,400	5,946,677	242	2,430
1936	20	809			146	788	1,753,415	596,796	9,748,715	4,399,303	192	1,677
1937	22	1,066					1,648,963	733,935	11,530,177	5,174,859	286	2,574
1938	16	515					2,211,682	751,491	11,186,563	4,863,582	252	2,268
1939	25	877					2,284,995	870,268	10,648,031	4,311,175	300	2,400
1940	24	938					2,087,878	809,075	11,885,556	4,546,106	220	1,760
1941	60	2,293			631	1,579	2,960,924	1,151,322	11,233,788	4,298,160	186	1,488
1942	Censored				815	2,037	2,599,861	1,091,202	10,596,204	4,467,996	256	2,048
Total			749	30,462	445,764	1,402,325		14,115,499	290,489,567	156,954,870	9,121	105,166

NOTE.—In addition there was produced in 1931-731 pounds of selenium valued at \$1,389.

Table 12.—Historical Summary of the Mineral Production of British Columbia
—Continued

STONE

	Granite		Limestone		Marble		Sandstone		Grindstones, pulpstones		Slate	
	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$	tons	\$
1909.....		134,310		37,258		25,000		168,513				
1910.....		244,767		43,121		3,679		130,825				
1911.....		460,851		56,748		1,600		179,580				
1912.....		624,178		55,617				99,816				
1913.....		469,666		38,830		600		71,783				
1914.....		918,131		51,435		3,343		51,774				
1915.....		701,593		79,583		1,700		14,000				
1916.....		464,949		92,769				6,500				
1917.....		66,170		89,808				110,000				
1918.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1919.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1920.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)				
1921.....	108,225	186,629	33,816	42,536								
1922.....	159,904	268,008	36,566	44,583			1,200	12,000				
1923.....	151,389	230,582	13,711	19,284								
1924.....	150,522	248,360	27,053	21,881			650	83,500	240	19,000		
1925.....	192,177	264,910	58,172	54,059			5,877	18,227	481	27,781		
1926.....	163,077	244,197	81,844	106,220			8,140	7,830	700	45,116		
1927.....	174,945	241,412	81,008	107,984	600	18,600			380	27,600		
1928.....	201,030	275,947	68,179	83,193	950	31,400	1,280	1,280	246	20,509		
1929.....	286,883	340,011	119,222	143,319	196	5,282	2,630	23,043	210	2,730		
1930.....	229,000	283,739	122,409	145,443	6,363	31,141	3,319	258,172	329	26,222	150	3,000
1931.....	302,150	322,014	159,198	152,269	810	8,761	9,559	592,740	322	25,795	250	5,000
1932.....	266,008	261,144	138,132	109,399	482	4,029	3,020	3,480	60	3,500	250	3,750
1933.....	94,967	109,512	150,805	130,706	300	2,547	4,200	10,760	200	9,000	250	3,750
1934.....	48,809	73,081	161,755	142,560	150	1,416			402	17,625	312	3,744
1935.....	118,782	100,432	215,933	189,381	604	5,471	21,576	63,006	202	10,829	310	3,100
1936.....	243,427	131,750	122,535	123,607	175	2,110	18,434	135,944	87	4,500	184	2,479
1937.....	273,692	318,725	176,513	177,939			13,220	52,561	87	4,875	186	2,790
1938.....	148,896	160,457	125,842	124,322			13,325	41,825			274	3,295
1939.....	101,214	120,404	205,045	200,842			6,460	29,060			419	5,428
1940.....	162,126	157,666	282,170	282,095	180	2,600	6,320	20,337			474	6,883
1941.....	129,941	146,403	201,359	229,702	300	2,800	8,640	15,650			950	12,216
1942.....	95,604	133,810	199,496	230,139	100	1,820	13,930	13,930			1,211	16,643
Total.....									3,946	245,082	5,220	72,078

(a) Data by kinds not available; total values of all kinds of stone were:—1918—\$187,842; 1919—\$217,006; 1920—\$276,505.

Table 12.—Historical Summary of Mineral Production of British Columbia
—Concluded

	Peat moss		Sulphur*		Talc		Zinc†		Other products
	tons	\$	tons	\$	tons	\$	tons	\$	\$
1905.....							9,413	139,200	
1906.....							654	17,100	
1907.....							1,356	46,100	
1908.....									(d) 643,534
1909.....							(a) 17,476	233,749	(c) 330,201
1910.....							4,487	114,243	(b) 494,197
1911.....							2,590	101,072	
1912.....							6,405	211,399	
1913.....							7,554	180,127	
1914.....							9,924	252,546	671
1915.....							14,595	538,438	15,833
							lb.		
1916.....			1,060	5,300	53	848	21,701,560	2,778,667	
1917.....			5,709	28,545	25	400	27,861,441	2,479,947	241,661
1918.....			18,238	63,454			32,280,247	2,633,745	103,739
1919.....			6,730	33,650	100	500	30,295,015	2,223,048	373,193
1920.....			11,275	56,376	110	3,100	38,729,762	2,970,960	1,270,298
1921.....			3,597	4,557	167	4,175	53,089,356	2,471,310	925,361
1922.....			6,908	34,540	194	4,780	56,290,000	3,217,536	
1923.....			3,457	13,304	245	5,390	60,050,000	3,967,504	
1924.....			8,091	40,459	165	3,630	96,000,069	6,090,244	
1925.....			2,670	13,360	92	1,589	99,152,966	7,557,439	
1926.....			3,374	16,870			137,033,929	10,154,214	
1927.....			37,379	149,516	107	2,620	148,306,479	9,186,103	
1928.....			32,063	254,872			163,530,890	8,983,079	
1929.....			28,276	226,208	46	720	172,096,841	9,270,857	
1930.....			17,800	147,942	177	2,835	250,479,310	9,017,255	
1931.....			29,013	255,760	30	600	202,071,702	5,160,911	
1932.....			31,886	302,856	39	702	130,546,958	3,140,438	
1933.....			30,010	282,078	67	1,022	152,826,264	4,906,487	
1934.....			32,031	319,124	25	502	249,152,403	7,583,202	
1935.....			46,784	453,536	93	1,318	255,222,315	7,909,314	
1936.....			64,896	608,792	47	799	255,668,574	8,475,413	
1937.....			88,370	820,406			287,192,877	14,078,195	
1938.....			78,918	777,586			299,363,564	9,199,443	
1939.....	(e)	(e)	133,676	1,230,814			279,041,497	8,563,784	
1940.....	(e)	(e)	90,214	899,126			312,020,671	10,643,025	
1941.....	14,345	390,509	103,140	1,026,794			367,869,579	12,548,031	
1942.....	28,520	658,771	116,248	1,134,586			387,236,469	13,208,636	(f) 4,710
Total.....			1,031,813	9,200,401	1,779	35,530		190,252,761	4,403,398

NOTE.—1934—Production of 30 tons of volcanic dust, valued at \$600.

*Sulphur content of pyrites shipped and sulphur content salvaged smelter gas 1928-1942; figures for previous years represent tonnages and value of pyrites shipped.

†1905-1915 tons of ore or concentrates shipped from mines; 1916-1942 refined zinc made in Canada plus concentrated zinc in ores exported.

(a) Includes 7,424 tons shipped late in 1908.

(b) Includes cement sand-lime brick, etc.

(c) Includes cement, sand-lime brick, and a small value in refined antimony.

(d) Includes stone, etc.

(e) Included with manufactures.

(f) 471 pounds of iridium valued at \$4,710.

Table 12.—Historical Summary of the Mineral Production of Yukon

—	Coal (d)		Copper		Gold (e)		Lead		Silver	
	tons	\$	pounds	\$	fine oz.	\$	pounds	\$	fine oz.	\$
1885										
1886					4,837	100,000				
1887					3,386	70,000				
1888					1,935	40,000				
1889					8,466	175,000				
1890					8,466	175,000				
1891					1,953	40,000				
1892					4,233	87,500				
1893					8,514	176,000				
1894					6,047	125,000				
1895					12,094	250,000				
1896					14,513	300,000				
1897					120,937	2,500,000				
1898					483,750	10,000,000				
1899					774,000	16,000,000			230,000	137,034
1900					1,077,553	22,275,000			290,000	177,857
1901	(e) 5,864	86,230			870,750	18,000,000			195,000	114,953
1902	4,910	37,280			701,437	14,500,000			185,900	96,985
1903	1,849	29,584			592,594	12,250,000			156,000	83,362
1904					507,938	10,500,000			133,170	76,201
1905	7,000	21,000			381,001	7,876,000			89,630	54,093
1906	7,000	28,000	(b) 156,000	23,400	270,900	5,600,000			63,665	42,522
1907	15,000	60,000	511,838	102,388	152,381	3,150,000			35,988	23,510
1908	3,847	21,158	112,264	14,828	174,150	3,600,000			63,000	33,304
1909	7,364	49,502			191,565	3,960,000			45,000	23,176
1910	16,185	110,925	286,000	36,431	211,091	4,570,362			87,418	46,756
1911	2,840	12,780			224,197	4,634,574			112,708	60,078
1912	9,245	44,958	1,772,660	289,670	268,447	5,549,296			81,068	49,318
1913	19,722	95,945	1,843,530	281,489	282,838	5,846,780	2,804	131	87,626	52,392
1914	13,443	53,760	1,367,050	185,946	247,940	5,125,374	47,920	2,146	92,973	50,959
1915	9,724	38,896	533,216	92,113	230,173	4,758,098	810,000	45,360	248,049	123,241
1916	3,300	13,200	2,807,096	763,586	212,700	4,396,900	955,222	81,818	360,101	236,446
1917	4,872	(f) 29,232	2,460,079	668,650	177,667	3,672,703	127,844	14,238	119,605	97,379
1918	2,900	11,600	619,878	152,663	102,474	2,118,325	9,249	856	71,915	69,594
1919			165,184	30,874	90,705	1,875,039			27,556	30,621
1920			277,712	48,478	72,778	1,504,455			19,190	19,363
1921	233	2,472			65,994	1,364,217	2,472,615	141,978	393,092	246,288
1922	465	4,650			54,456	1,125,705	3,323,508	207,221	663,493	447,997
1923	313	1,485			60,144	1,243,287	6,771,113	486,098	1,914,438	1,241,953
1924	1,121	8,265			34,825	719,897	903,520	73,221	226,755	151,429
1925	730	7,147			47,817	988,465	1,875,442	171,040	904,893	624,964
1926	316	800			25,601	529,220	5,860,373	395,634	2,095,027	1,301,159
1927	414	2,052			30,935	639,433	4,165,331	218,929	1,647,295	928,580
1928	414	2,915	(a) 107,377	15,645	34,364	710,367	7,191,449	329,045	2,839,633	1,651,985
1929	458	1,848			35,892	741,954	8,395,603	424,012	3,279,530	1,737,922
1930	653	3,110	42,628	5,534	35,517	734,202	8,896,582	349,369	3,746,326	1,429,373
1931	904	5,039			44,310	955,539	4,454,613	120,724	3,694,728	1,103,615
1932	808	3,491			40,608	953,438	3,853,327	81,444	3,014,755	954,822
1933	862	3,670			39,493	1,129,500	3,099,505	74,128	2,204,237	833,925
1934	638	2,217			38,798	1,338,531	1,783,349	43,450	515,542	244,681
1935	835	3,483			35,707	1,256,529	218,513	6,846	54,715	35,450
1936	510	2,288			50,358	1,764,041	2,568,699	100,513	783,416	353,532
1937	84	812			47,982	1,678,890	6,440,454	329,107	3,956,504	1,775,719
1938	361	3,400			72,368	2,545,544	5,198,990	173,854	2,844,659	1,236,772
1939					87,745	3,171,192	7,544,632	239,089	3,830,864	1,551,040
1940					80,458	3,097,633	4,655,689	156,524	2,259,343	864,176
1941					70,959	2,731,922	1,703,728	57,280	856,772	327,810
1942					83,246	3,204,971	1,322,065	44,448	482,133	203,296
Totals.....	145,184	803,192	13,062,512	2,711,695	9,621,987	208,425,933	94,652,139	4,368,003	45,003,712	20,945,637

(a) Includes small quantities produced in 1925, 1926 and 1927.

(b) 1906 and all previous production.

(c) Placer gold but includes a small production from lode mines in 1926 and for the years 1910-1923.

(d) For the years 1919-1938 the tonnage shown is the total output from all mines; for previous years the figures shown include only colliery consumption, sales and coal used by operators.

(e) Partly mined in 1900.

(f) Value estimated.

NOTE.—In addition there were produced in 1918 some 3,843 pounds of tungsten concentrates valued at \$2,593 and in 1916, 20 tons of antimony ore valued at \$160; also in 1941 tungsten concentrates totalled 1,560 pounds valued at \$980 and in 1942, 968 pounds valued at \$340. Antimony in ore exported in 1942 totalled 78 pounds worth \$13.

Table 12.—Historical Summary of the Mineral Production of Northwest Territories

—	Pitch- blende Products	Copper		Gold		Lead		Natural Gas		Petroleum		Silver (a)	
	\$	pounds	\$	fine oz.	\$	pounds	\$	Mc. ft.	\$	barrels	\$	fine oz.	\$
1931..												(*)	(*)
1932..										910	9,251	38,433	12,172
1933..	247,900									4,608	23,037	23,239	8,792
1934..	159,400					3,531	86			4,438	22,188	37,778	17,930
1935..	413,700			200	7,038	12,905	404			5,115	25,575	146,506	94,921
1936..	605,500			1	35			1,100	245	5,399	26,995	317,014	143,059
1937..	876,540							1,500	335	11,371	56,855	135,442	60,788
1938..	1,045,458	75,567	7,535	6,800	239,190			1,500	335	22,855	68,565	581,902	252,993
1939..	1,121,553	42,382	4,277	51,914	1,876,224			1,500	335	20,191	50,477	483,874	195,911
1940..	410,176			55,159	2,123,621			1,500	335	18,633	37,265	59,505	22,760
1941..	925,196	32,727	3,301	74,417	2,865,054			1,500	335	23,664	47,328	15,327	5,864
1942..	(b)	74,963	7,561	99,394	3,826,669			1,500	335	75,789	108,477	22,531	9,500
Total		225,639	22,674	287,885	10,937,831	16,436	490	10,100	2,255	192,973	476,013		

(a) Includes recoveries from silver-pitchblende ores.

(*) See Yukon.

Production of tungsten concentrates totalled 41,972 pounds valued at \$13,220 in 1941 and 98,218 pounds worth \$23,725 in 1942.

(b) Not available for publication.

Table 12 (A).—Tonnage of Ore Mined and Rock Quarried in the Canadian Mining Industry, 1922, 1941 and 1942

	1922	1941	1942
Gold quartz ores.....	17,722,866	20,031,736	2,431,340
Copper-gold-silver ores.....	8,575,626	9,263,071	1,004,097
Nickel-copper ores.....	12,081,545	9,974,272	259,569
Silver-cobalt ores.....	25,550	11,507	426,445
Silver-lead-zinc ores.....	2,951,480	2,816,974	505,774
Miscellaneous metals.....	1,120,478	883,851	
Asbestos.....	8,233,516	7,707,367	2,562,933
Feldspar and nepheline syenite.....	77,049	57,861	
Quartz.....	487,664	335,085	125,245
Gypsum.....	794,836	1,532,228	484,629
Talc and soapstone.....	30,376	38,067	
Iron oxides.....	15,629	15,917	
Other non-metals.....	457,251	412,159	
Stone, all kinds, quarries (exclusive of stone used for cement and lime).....	7,978,066	7,940,801	3,639,081
Stone used for the manufacture of cement (estimated from 1922-1929).....	2,155,750	2,086,781	1,600,000
Estimate rock for the manufacture of lime.....	1,574,508	1,530,200	561,000
Total (other than coal).....	64,282,240	64,637,877	13,600,113
Total coal.....	18,865,030	18,225,921	15,157,431

For years 1923 to 1940, see Annual Mineral Production Report, year 1941.

Table 13.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1938-1942

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Metal Mining Industries							
ALLUVIAL GOLD MINES							
1938.....	111	113	12,846,973	1,071	2,056,936	288,370	3,753,052
1939.....	98	104	9,844,524	830	1,439,765	318,613	4,204,974
1940.....	125	126	9,933,894	840	1,680,779	298,680	3,820,169
1941.....	108	110	10,755,706	797	1,954,278	332,361	3,800,142
1942.....	80	80	10,071,917	471	1,283,274	206,635	4,114,995
AURIFEROUS QUARTZ MINES							
1938.....	535	550	251,203,802	29,647	50,462,092	28,674,805	114,472,106
1939.....	455	474	248,692,569	30,622	53,206,225	30,380,927	129,633,245
1940.....	428	438	250,919,160	31,405	55,205,096	32,075,741	146,713,744
1941.....	338	357	243,138,864	32,551	62,150,810	33,124,349	145,078,633
1942.....	223	227	245,240,997	26,030	54,388,872	28,625,881	131,938,902
COPPER-GOLD-SILVER MINES							
1938.....	37	39	65,416,729	5,577	8,921,465	20,544,691	28,795,492
1939.....	28	30	58,867,620	6,083	9,920,591	24,978,891	26,182,577
1940.....	25	26	60,446,948	6,115	10,777,827	25,370,357	**27,804,419
1941.....	21	22	81,521,902	5,866	10,695,023	34,608,742	30,220,331
1942.....	26	28	84,776,243	5,646	11,097,412	35,459,148	33,688,642
SILVER-COBALT MINES							
1938.....	34	30	2,696,217	297	386,851	446,070	288,293
1939.....	36	43	2,461,556	323	412,728	237,096	653,032
1940(e).....	48	44	337,080	123	158,024	57,347	809,283
1941.....	24	14	439,877	182	229,984	126,372	662,443
1942.....	13	14	358,691	192	283,980	150,043	600,207
SILVER-LEAD-ZINC MINES*							
1938.....	107	108	30,386,714	1,640	3,027,915	5,068,253	18,483,945
1939.....	82	83	23,664,620	1,646	2,803,057	4,699,242	13,555,609
1940.....	82	83	19,969,198	1,585	3,052,532	4,380,568	16,439,630
1941.....	63	64	17,717,334	1,666	3,452,109	3,624,765	20,453,212
1942.....	44	44	19,484,442	2,185	4,730,370	4,268,352	23,504,642
NICKEL-COPPER MINES							
1938.....	8	11	35,363,940	5,342	9,916,179	5,174,237	25,491,028
1939.....	4	7	35,307,319	5,759	10,960,710	6,117,331	32,259,124
1940.....	6	6	36,765,154	6,372	12,256,863	6,783,621	34,240,489
1941.....	3	6	41,730,329	6,490	13,680,994	7,214,448	41,525,277
1942.....	4	8	48,303,780	7,147	15,365,207	8,186,777	50,801,633
MISCELLANEOUS METAL MINES							
1938.....	19	19	1,380,035	129	145,551	16,906	-7,997
1939.....	31	31	3,074,999	331	455,278	175,573	349,404
1940.....	36	36	2,720,642	445	628,025	720,173	1,309,105
1941.....	46	47	2,931,695	725	1,141,244	1,355,563	2,073,323
1942.....	68	67	3,956,427	1,352	2,396,731	1,519,686	3,996,555
Non-Ferrous Metal Smelting and Refining							
1938.....	10	13	184,337,126	12,788	19,549,963	(b)200,204,359	† 87,091,374
1939.....	9	13	192,186,465	12,449	19,372,119	(b)182,544,662	† 80,057,833
1940.....	9	13	234,826,742	13,466	21,766,197	(b)207,301,259	† 98,059,288
1941.....	9	13	309,963,342	16,014	27,482,689	(b)259,585,976	† 119,736,294
1942.....	10	15	356,052,965	21,162	37,340,556	(b)321,736,152	† 125,881,047
Total Metal Mining Industries							
1938.....	861	883	583,631,536	56,491	94,466,952	260,417,691	278,367,293
1939.....	743	785	574,099,672	58,043	98,570,473	249,452,335	286,895,795
1940.....	756	772	615,918,818	60,351	105,525,343	276,988,746	**329,196,007
1941.....	612	633	708,199,049	64,291	120,787,221	339,972,576	364,649,855
1942.....	(f)468	483	768,245,462	64,155	126,886,402	400,152,674	374,526,623

*Contains data relating to silver-pitchblende ores in the Northwest Territories. †Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes and cost of ores, etc., treated which were \$173,070,377 in 1938, \$154,879,498 in 1939, \$174,274,655 in 1940, \$213,542,005 in 1941 and \$258,903,818 in 1942.

(c) See end of table.

(d) The large decrease in capital employed in the Silver-Cobalt industry in 1940 resulted largely from the leasing of the O'Brien mine and the cessation of mining operations by M. J. O'Brien Ltd. Delinquent returns, received after completion of these totals show 83 employees receiving \$88,105 in salaries and wages in the Silver-Cobalt industry also capital was increased by \$154,109.

(f) 371 producing. **Revised data.

Table 13.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1938-1942—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Total Non-Metal Mining Industries including Fuels							
*FUELS							
COAL							
1938.....	462	498	111,495,137	27,074	28,699,781	7,926,328	34,207,513
1939.....	467	510	109,072,484	26,472	30,720,991	8,203,815	38,062,870
1940.....	491	527	103,634,890	26,434	34,043,162	8,996,231	43,552,679
1941.....	417	469	106,498,356	26,330	38,149,602	9,680,614	45,780,856
1942.....	380	419	108,766,697	26,205	42,091,137	10,965,528	49,473,229
NATURAL GAS							
1938.....	218	3,325	79,143,830	1,966	2,506,121	82,887	9,748,677
1939.....	222	3,352	78,409,338	1,990	2,536,220	98,397	10,634,146
1940.....	236	3,438	80,487,766	2,189	2,748,740	94,354	11,108,749
1941.....	231	3,424	81,280,541	2,161	2,841,795	108,204	11,114,899
1942.....	212	3,566	82,768,602	1,940	2,826,811	104,802	11,251,548
PETROLEUM							
1938.....	310	2,400	51,685,038	1,894	2,656,112	1,141,762	8,986,071
1939.....	348	2,389	52,102,077	1,780	2,567,983	1,432,055	9,310,922
1940.....	300	2,360	53,216,853	1,741	2,835,410	1,467,995	10,018,083
1941.....	272	2,312	58,206,984	1,844	3,254,817	803,798	14,207,526
1942.....	242	2,253	54,707,282	1,972	3,648,965	1,207,463	15,668,660
TOTAL FUELS							
1938.....	990	6,223	242,324,005	30,934	33,862,014	9,150,977	52,942,261
1939.....	1,037	6,251	239,583,899	30,242	35,825,194	9,734,267	58,007,938
1940.....	1,027	6,356	237,339,509	30,364	39,627,512	10,558,580	64,679,511
1941.....	920	6,205	245,985,881	30,335	44,246,214	10,592,616	71,103,281
1942.....	834	6,238	246,242,581	30,117	48,566,913	12,277,793	76,393,437
OTHER NON-METAL MINING INDUSTRIES							
ASBESTOS							
1938.....	8	9	22,008,771	3,711	4,024,363	3,187,725	9,702,407
1939.....	8	9	22,489,233	3,784	4,347,064	3,463,513	12,395,699
1940.....	8	9	19,799,280	3,886	4,728,702	3,720,968	11,903,688
1941.....	9	10	21,325,558	3,760	4,996,101	4,246,246	17,229,399
1942.....	8	10	18,741,364	3,749	5,299,454	4,393,973	18,277,235
FELDSPAR, QUARTZ, AND NEPHELINE SYENITE							
1938.....	32	32	1,605,136	375	342,248	168,509	1,065,138
1939.....	43	43	1,591,015	338	330,170	178,721	1,173,950
1940.....	44	46	2,174,258	400	377,254	214,517	1,294,482
1941.....	38	38	2,314,582	506	610,489	250,983	1,587,071
1942.....	36	38	2,563,248	533	782,903	412,028	1,586,968

* Production of peat since 1929 included with the other non-metallics.

(d) See footnote at end of table.

Table 13.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1938-1942—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
OTHER NON-METAL MINING INDUSTRIES—Continued							
GYPSUM							
1938.....	9	15	7,325,412	623	528,027	239,306	1,262,959
1939.....	10	17	6,806,907	714	692,158	299,319	1,635,808
1940.....	9	16	4,648,662	694	717,666	418,339	1,647,594
1941.....	8	15	5,175,821	648	745,008	452,008	1,796,420
1942.....	7	13	4,386,531	510	657,620	244,139	1,010,043
IRON OXIDES (OCHRE)							
1938.....	6	6	200,057	37	31,557	8,124	63,645
1939.....	7	7	215,445	38	26,916	8,194	80,224
1940.....	7	7	195,263	46	38,842	18,033	93,841
1941.....	4	4	189,877	44	42,152	21,394	120,675
1942.....	5	5	194,541	47	44,288	26,615	125,038
MICA							
1938.....	40	40	159,758	156	74,424	19,247	61,742
1939.....	61	61	230,337	224	112,653	19,014	128,307
1940.....	65	65	259,168	218	134,705	27,829	209,316
1941.....	81	81	1,180,097	246	181,800	39,529	295,759
1942.....	106	106	1,460,769	361	258,605	37,313	346,254
PEAT (e)							
1940.....	(f)	(f)	(f)	(f)	(f)	(f)	(f)
1941.....	22	22	825,154	667	486,116	17,472	628,936
1942.....	35	35	3,212,921	1,316	1,380,142	277,086	1,031,211
SALT							
1938.....	9	9	4,270,799	562	786,720	309,080	1,603,833
1939.....	9	9	4,447,204	547	741,736	1784,778	2,173,204
1940.....	9	9	4,993,914	586	836,506	1860,768	2,461,482
1941.....	9	9	5,559,307	668	1,018,652	1,175,966	2,676,533
1942.....	9	9	5,687,511	675	1,114,574	1,419,248	3,173,755
TALC AND SOAPSTONE							
1938.....	6	6	212,491	75	59,426	23,907	120,941
1939.....	6	6	239,835	65	60,512	22,332	147,734
1940.....	8	8	319,398	94	80,879	37,130	192,509
1941.....	8	8	695,581	148	128,820	55,206	305,603
1942.....	10	10	567,665	115	113,601	59,113	251,711
MISCELLANEOUS							
1938.....	50	50	2,787,671	394	475,567	409,229	779,093
1939.....	46	47	3,128,035	465	539,143	394,357	964,565
1940.....	46	46	2,491,527	547	703,501	608,028	1,508,728
1941.....	61	63	2,648,830	683	878,700	797,564	1,645,184
1942.....	61	64	4,919,871	811	1,142,072	952,860	2,053,307

(d) See footnote at end of this table.

(e) Includes data on peat fuel, peat moss and peat humus.

(f) Peat moss included with manufactures; peat fuel under miscellaneous non-metals.

‡ Value of containers is included from 1939.

Table 13.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1938-1942—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
TOTAL OTHER NON-METAL MINING INDUSTRIES							
1938.....	160	167	38,570,095	5,933	6,322,332	4,365,127	14,659,821
1939.....	190	199	39,148,011	6,175	6,850,352	5,170,228	18,699,491
1940.....	196	208	34,881,470	6,471	7,618,055	5,905,612	19,511,640
1941.....	240	250	39,914,807	7,370	9,087,838	7,056,568	26,285,580
1942.....	277	290	41,734,421	8,117	10,793,259	7,822,375	27,855,522
Total Non-Metal Mining Industries, including Fuels							
1938.....	1,150	6,390	280,894,100	36,867	40,184,346	13,516,104	67,602,082
1939.....	1,227	6,450	278,731,910	36,417	42,675,546	14,904,495	76,707,429
1940.....	1,223	6,531	272,220,979	36,835	47,245,367	16,464,192	83,991,151
1941.....	1,160	6,455	285,900,688	37,705	53,334,052	17,648,984	97,388,861
1942.....	1,111	6,528	287,977,002	38,234	59,360,172	20,100,168	104,248,959
Clay Products and Other Structural Materials							
CLAY PRODUCTS							
Brick, Tile and Sewer Pipe							
1938.....	140	147	17,756,732	2,125	2,009,836	1,039,148	3,284,436
1939.....	133	141	17,614,307	2,055	2,072,351	1,093,160	3,852,837
1940.....	132	136	16,569,424	2,343	2,488,390	1,402,681	4,581,541
1941.....	127	132	16,734,645	2,557	2,931,278	1,748,511	5,323,433
1942.....	111	115	17,181,503	2,152	2,777,171	1,420,355	5,016,090
STONEWARE AND POTTERY							
1938.....	5	5	311,810	117	100,397	14,701	197,749
1939.....	8	8	326,435	110	89,337	14,338	190,901
1940.....	7	7	577,019	214	186,861	19,547	340,778
1941.....	10	10	642,908	324	246,507	20,062	483,330
1942.....	8	8	612,428	371	295,840	30,884	614,394
TOTAL CLAY PRODUCTS*							
1938.....	145	152	18,068,542	2,242	2,110,233	1,053,849	3,482,235
1939.....	141	149	17,940,742	2,165	2,161,688	1,107,498	4,045,738
1940.....	139	143	17,146,443	2,557	2,675,251	1,422,223	4,922,519
1941.....	137	142	17,377,553	2,881	3,227,785	1,768,573	5,806,763
1942.....	119	123	17,793,931	2,523	3,073,011	1,451,239	5,680,484
OTHER STRUCTURAL MATERIALS†							
CEMENT							
1938.....	3	8	52,299,046	1,034	1,306,331	2,293,584	5,947,766
1939.....	3	8	51,251,358	1,001	1,297,542	2,238,039	6,273,172
1940.....	3	8	50,370,276	1,052	1,515,766	4,291,221	8,715,422
1941.....	3	8	51,108,294	1,235	1,860,931	5,044,208	9,279,164
1942.....	3	8	51,121,894	1,241	2,059,337	5,414,487	10,213,916

(*) Includes kaolin and other clays.

(†) A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see chapter 9.

Table 13.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1938-1942—Concluded

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material)	5 Number of employees	6 Salaries and wages	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
OTHER STRUCTURAL MATERIALS—Concluded							
LIME							
1938.....	48	53	4,881,214	867	795,068	939,989	2,602,663
1939.....	54	59	4,802,983	937	849,468	1,052,012	2,951,502
1940.....	50	55	5,107,739	962	1,003,671	1,601,546	3,593,009
1941.....	45	50	4,633,946	1,105	1,321,571	2,196,529	4,161,412
1942.....	44	48	4,742,066	1,022	1,312,320	2,598,560	3,932,279
SAND AND GRAVEL							
1938.....	1,339	6,094	3,286,340	6,959	4,482,916	254,595	11,747,959
1939.....	1,403	6,215	2,735,690	6,120	3,981,913	274,509	10,966,593
1940.....	1,458	5,596	3,456,502	4,243	3,744,585	291,008	11,468,237
1941.....	1,399	5,407	4,287,789	3,252	2,995,526	474,647	9,901,076
1942.....	1,419	5,217	4,477,547	2,141	2,404,755	677,149	8,328,265
STONE							
1938.....	429	550	11,187,274	2,815	2,298,154	890,350	4,665,676
1939.....	452	573	12,213,030	3,076	2,816,578	1,081,884	5,393,812
1940.....	482	560	12,127,271	2,886	2,779,703	1,204,375	6,194,584
1941.....	457	539	11,162,036	2,758	2,896,100	1,283,183	6,717,501
1942.....	412	490	10,988,011	2,697	3,454,263	1,517,169	7,229,425
TOTAL OTHER STRUCTURAL MATERIALS							
1938.....	1,819	6,705	71,653,874	11,675	8,882,469	4,378,518	24,964,064
1939.....	1,912	6,855	71,005,061	11,134	8,945,501	4,646,444	25,585,079
1940.....	1,993	6,219	71,061,788	9,143	9,043,725	7,388,160	29,971,252
1941.....	1,904	6,004	71,192,065	8,350	9,074,128	8,998,567	30,069,163
1942.....	1,878	5,763	71,329,518	7,101	9,250,675	10,207,565	29,708,886
Total Clay Products and Other Structural Materials							
1938.....	1,964	6,857	89,722,416	13,917	10,992,702	5,432,367	28,446,299
1939.....	2,053	7,004	88,943,803	13,299	11,107,189	5,753,942	29,628,817
1940.....	2,132	6,362	88,208,231	11,700	11,718,976	8,810,378	34,893,751
1941.....	2,041	6,146	88,569,618	11,231	12,301,913	10,767,140	35,865,916
1942.....	1,997	5,886	89,123,449	9,624	12,303,686	11,658,604	35,334,369
GRAND TOTAL OF ALL INDUSTRIES							
1938.....	3,975	14,130	954,248,052	107,275	145,644,000	279,366,162	374,415,674
1939.....	4,023	14,239	941,775,385	107,759	152,353,208	270,110,772	393,232,044
1940.....	4,111	13,665	976,348,028	108,886	164,489,686	302,263,316	*448,080,729
1941.....	3,813	13,234	1,082,669,355	113,227	186,423,186	368,388,700	497,904,632
1942.....	3,576	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,951

NOTE.—The net value as given in column 8 represents the gross value as given by the operator less the cost of items indicated in column 7.

* Revised data.

Table 14.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1938-1942

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*)
		\$		\$	\$	\$
NOVA SCOTIA						
1938.....	810	52,594,162	15,591	15,959,095	5,258,556	20,224,347
1939.....	914	52,580,559	15,202	17,371,518	5,450,671	23,504,419
1940.....	666	48,086,422	14,934	19,285,662	6,041,154	26,189,233
1941.....	622	48,356,346	15,246	21,388,809	6,684,110	24,535,707
1942.....	694	49,486,020	14,394	22,169,053	6,594,557	25,174,960
NEW BRUNSWICK						
1938.....	409	4,310,273	3,042	2,074,273	273,978	3,506,250
1939.....	426	4,466,757	3,263	2,311,835	329,538	3,600,454
1940.....	423	4,522,307	2,240	1,939,160	376,192	3,024,317
1941.....	428	4,429,485	2,262	2,097,842	421,785	3,231,658
1942.....	433	4,401,029	1,718	1,855,798	404,750	3,176,007
QUEBEC						
1938.....	4,161	179,013,810	20,829	24,485,254	79,226,191	69,593,807
1939.....	4,137	179,371,057	20,872	25,689,382	81,840,188	81,000,118
1940.....	3,857	213,363,729	21,726	29,025,418	93,034,012	⊕ 100,154,979
1941.....	3,780	298,678,687	23,149	34,008,021	127,618,884	127,049,905
1942.....	3,442	329,023,834	27,235	42,901,445	169,770,830	138,100,940
ONTARIO						
1938.....	6,342	389,031,046	35,791	58,926,900	136,143,954	181,897,886
1939.....	6,380	397,025,573	37,233	63,220,042	119,307,190	188,867,969
1940.....	6,406	405,063,185	38,774	66,395,845	135,879,424	209,277,055
1941.....	6,196	408,374,770	40,496	74,902,555	154,713,109	219,459,986
1942.....	6,324	438,130,467	36,866	72,868,161	168,749,548	212,351,819
MANITOBA						
1938.....	276	44,564,907	2,840	4,393,270	14,478,826	15,144,672
1939.....	260	36,516,216	3,027	4,541,992	16,217,955	12,401,404
1940.....	136	39,640,423	3,145	5,107,054	16,016,832	14,065,270
1941.....	185	41,780,442	3,101	5,312,075	18,966,154	11,898,109
1942.....	173	33,172,231	2,512	4,600,171	12,476,881	9,508,569
SASKATCHEWAN						
1938.....	269	18,695,606	2,287	2,470,530	5,345,294	7,029,842
1939.....	258	18,838,439	2,026	2,347,264	6,749,197	6,391,404
1940.....	252	17,008,171	1,961	2,573,878	7,033,060	8,652,006
1941.....	249	22,851,100	1,977	3,105,529	12,689,122	9,336,756
1942.....	219	34,755,279	2,450	4,401,181	22,710,389	14,487,408

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, preceding table.

⊕ Revised data.

Table 14.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1938-1942—Concluded

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*)
		\$		\$	\$	\$
ALBERTA						
1938.....	678	120,140,472	10,612	12,811,975	2,967,269	24,931,056
1939.....	709	121,311,648	10,548	13,097,818	3,508,845	26,049,861
1940.....	729	120,234,760	10,628	14,535,789	3,832,268	29,593,293
1941.....	742	129,681,543	11,141	17,065,351	3,612,114	36,167,469
1942.....	723	126,642,796	11,446	19,628,105	4,736,312	40,604,704
BRITISH COLUMBIA						
1938.....	1,158	129,667,163	15,179	21,975,143	33,686,771	49,519,855
1939.....	1,130	119,437,585	14,587	21,698,690	34,754,310	45,419,651
1940.....	1,169	115,249,764	14,420	23,227,719	38,730,717	52,513,427
1941.....	1,008	114,213,762	14,801	25,797,418	42,582,946	60,323,299
1942.....	845	110,267,057	14,323	27,166,996	45,101,414	64,378,171
NORTHWEST TERRITORIES						
1938.....	17	4,186,077	310	584,619	407,710	(a)---(e)
1939.....	15	2,110,344	273	468,996	354,228	1,592,779
1940.....	16	3,037,930	441	880,414	623,965	1,539,206
1941.....	12	4,267,299	553	1,174,903	565,197	2,355,624
1942.....	29	8,888,280	701	1,737,398	951,183	3,017,569
YUKON						
1938.....	11	12,044,536	794	1,962,941	1,577,613	2,667,051
1939.....	10	10,117,207	728	1,605,671	1,598,650	3,803,985
1940.....	11	10,141,337	617	1,518,747	695,692	3,091,943
1941.....	12	10,035,921	501	1,570,683	535,279	2,946,119
1942.....	15	10,578,920	398	1,221,952	415,582	3,309,804
Canada						
1938.....	14,130	954,248,052	107,275	145,644,000	279,366,162	374,415,674
1939.....	14,239	941,775,385	107,759	152,353,208	270,110,772	393,232,044
1940.....	13,665	976,348,028	108,886	164,489,686	302,263,316	⊕448,080,729
1941.....	13,234	1,082,669,355	113,227	186,423,186	368,388,700	497,904,632
1942.....	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,951

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

*See footnote, preceding table.

(a) Value of pitchblende not included.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, preceding table.

(e) Northwest Territories showed a loss of \$56,931 in 1937 and \$99,092 in 1938 owing to the fact that pitchblende is not included. These amounts should be subtracted from the total net value by provinces to give the total net value for Canada. The value of refinery products is credited to the non-ferrous smelting and refining industry of Ontario.

⊕ Revised data.

Table 15.—Summary, by Nine Main Branches, of the Net Value of Commodity Production in Canada, 1939-1941 (*)

	1939	1940	1941	Percentage of Total Net Value	
				1941	1940
	\$	\$	\$	%	%
Agriculture.....	826,390,000	885,115,000	951,025,000	20.14	23.15
Forestry.....	271,723,416	370,121,275	421,419,139	8.93	9.68
Fisheries.....	34,378,681	38,106,690	51,769,638	1.10	1.00
Trapping.....	7,919,412	11,207,930	15,138,040	0.32	0.29
Mining (Total).....	393,232,044	446,080,729	497,904,632	10.55	11.67
Auriferous quartz.....	129,633,245	146,713,744	145,978,833	3.10	3.84
Other mining.....	263,598,799	299,366,985	351,925,799	7.45	7.83
Electric power.....	149,863,892	163,780,757	183,146,426	3.88	4.23
Construction.....	183,706,338	206,893,992	269,561,885	5.71	5.41
Custom and repair.....	96,652,386	110,745,000	135,287,000	2.87	2.90
Manufactures, n.e.s.....	1,277,265,130	1,591,625,600	2,194,821,573	46.50	41.62
Grand Total†.....	3,241,131,299	3,823,676,973	4,720,073,333	100.00	100.00
Manufactures, Total†.....	1,531,051,901	1,914,412,381	2,605,119,788	55.19	50.07

*Business Statistics Branch, Dominion Bureau of Statistics (1941 Survey of Production Report.)

†The difference between "manufactures, total" and "manufactures, n.e.s." is the amount of the duplication between primary and second industries. The sum of "manufactures, n.e.s." and the eight other main branches is regarded as the grand total.

Table 16.—Provincial Distribution of the Net Value of Commodity Production in Canada, 1939-1941 (x)

Province	1939	1940	1941	Percentage of total net value, 1941
	\$	\$	\$	%
Prince Edward Island.....	12,554,392	13,826,491	13,200,776	0.28
Nova Scotia.....	109,739,925	132,038,545	136,856,241	2.90
New Brunswick.....	77,156,799	90,119,421	103,968,110	2.20
Quebec.....	841,474,236	1,011,051,952	1,279,353,703	27.10
Ontario.....	1,365,101,533	1,642,788,599	2,087,958,441	44.24
Manitoba.....	156,371,495	176,734,411	205,348,561	4.35
Saskatchewan.....	212,101,124	219,966,345	228,318,037	4.84
Alberta.....	209,850,313	234,388,768	276,898,177	5.87
British Columbia.....	†256,781,477	†302,762,441	379,925,005	8.05
Yukon and Northwest Territories.....			8,246,282	0.17
Canada.....	3,241,131,299	3,823,676,973	4,720,073,333	100.00

†Includes Yukon.

*Business Statistics Branch, Dominion Bureau of Statistics (1941 Survey of Production Report.)

Table 17.—Proportion Contributed by Mining to Total Net Value of Production in Each Province, 1939-1941

Province	1939		1940		1941		
	Mining net	Percentage of net value provincial production	Mining net	Percentage of net value provincial production	Mining net	Percentage of net value provincial production	
						All mines	Auriferous quartz mines only
	\$	%	\$	%	\$	%	%
Prince Edward Island.....							
Nova Scotia.....	23,504,419	22.36	26,189,233	19.83	24,535,707	17.9	0.01
New Brunswick.....	3,600,454	4.74	3,024,317	3.36	3,231,653	3.1	
Quebec.....	81,600,118	9.75	98,134,979	9.71	127,649,905	10.0	0.5
Ontario.....	188,867,969	13.69	209,277,055	12.74	219,459,986	10.5	2.1
Manitoba.....	12,401,404	8.29	14,065,270	7.96	11,898,109	5.8	0.05
Saskatchewan.....	6,391,404	2.82	8,652,006	3.93	9,336,756	4.1	0.01
Alberta.....	26,049,861	11.82	29,593,293	12.63	36,167,469	13.1	
British Columbia.....	†50,816,415	19.74	†57,144,576	18.87	60,323,299	15.9	0.3
Yukon and Northwest Territories.....					5,301,743	64.8	0.05
Canada.....	393,232,044	12.05	446,080,729	11.67	497,904,632	10.5	3.1

†Includes Yukon and Northwest Territories.

RECENT TAX CHANGES OF INTEREST TO THE MINING INDUSTRY (Department of Finance)

With a view to stimulating exploration and development of mineral resources in Canada, certain exemptions from income tax have been granted from time to time to new or re-opened mines coming into production. An amendment to the Income War Tax Act, made in May, 1936, provided that any metalliferous mine coming into production between May 1, 1936 and January 1, 1940 would be exempt from income tax for its first three fiscal periods following the commencement of production. The Minister of National Revenue, having regard to the production of ore in reasonable commercial quantities, determines which mines, whether new or old, qualify for this exemption, and a certificate is issued accordingly. In the 1939 session of Parliament an amendment to the Income Tax Act extended for a further three years the qualifying period for the above three-year exemption from January 1, 1940 to January 1, 1943.

In order to stimulate the production of wartime metals, Parliament in the 1942 session provided a three-year exemption from the excess profits tax for the profits of any company derived from the operation of any base metal or strategic mineral mine coming into production in the three years following after January 1, 1943. The Minister of National Revenue was given power to determine what mines, whether new or old, and what types of minerals would qualify for this exemption. Section 89 of the Income War Tax Act was not extended and will have application only to the period now mentioned in the statute.

Provision is made for an exemption from tax in respect of dividends paid to a company incorporated in Canada by a company which has never paid a tax by reason of the three-year exemption. It might be explained that under the Income Tax Act a corporation is exempt from tax on dividends received from another corporation if the paying corporation has already paid corporation income tax on its earnings. This is to avoid double taxation of corporate earnings. It is seen, therefore, that but for this provision, a receiving corporation would automatically lose the exemption (which it would otherwise enjoy) through the fact that the paying corporation had received the three-year exemption accorded to new mines and thus the purpose of the Government in allowing the three-year exemption would be defeated.

In the 1943 amendment to the Income War Tax Act a substantial concession was extended to corporations whose chief business is that of mining or exploring for metalliferous and strategic minerals. Such companies were granted a deduction from their combined income and excess profits taxes equal to $26\frac{2}{3}$ per cent of all prospecting, exploration and development expenses incurred in searching for base metals and strategic minerals during the period from January 1, 1943 to March 31, 1945, such deduction to be taken in the year of the expenditure. The deduction is contingent on provision by the company of certified statements of expenditures and submission of satisfactory evidence that the funds were expended in prospecting and exploring for base metals and strategic minerals by qualified persons.

As a companion measure to the above-mentioned exemption from excess profits tax, an amendment was made to the Income War Tax Act in 1942 designed to encourage prospecting for strategic minerals. It provided that a taxpayer contributing in 1942 to prospecting syndicates, associations or mining partnerships registered or otherwise recognized under the laws of any of the provinces, will be allowed a deduction from the income tax otherwise payable, equal to forty per cent of such contributions, provided that the tax credit will apply only in respect of contributions up to \$500 in the case of one syndicate, association or mining partnership, and only in respect of total contributions not exceeding \$5,000 in the case of any one taxpayer. In the 1943 amendment to the Income War Tax Act, this provision was extended for another year to apply to contributions made during 1943.

General regulations covering depletion allowance to precious metal mines are unchanged from the previous year and remain on the basis of $33\frac{1}{3}$ per cent for mining companies, with allowance in the case of dividends received by shareholders standing at 20 per cent.

A copy of Bill 104—The Excess Profits Tax Act 1940—is contained in the Dominion Bureau of Statistics "Gold Mining Report for 1939". Bill 78, an act to amend Bill 104 referred to above, was passed by the House of Commons on May 26, 1941 and was reprinted in the 1940 report. A copy of Bill 122, the 1942 amendment to the Act, is shown at the end of the report for that year. No amendments to the Excess Profits Tax Act specifically relating to the mining industry were enacted in 1943, but the relevant sections of the amendment to the Income War Tax Act referring to mining company expenditures for base and strategic metals exploration and also to contributions to prospectors' syndicates are reproduced in the Appendix of the 1942 gold report.

A further amendment to the Income War Tax Act provided that taxes payable by mining companies to municipalities under certain sections of the Assessment Act in the Province of Ontario shall be allowed as a deduction from the income of such companies in calculating their income and excess profits taxes, provided that the Minister of National Revenue is satisfied that in calculating the taxes payable to the municipalities under the above-mentioned Act no deduction is allowed in respect of income and excess profits taxes payable to the Dominion. This amendment will effect a change in the amount of taxes payable respectively to the municipalities and to the Dominion but leaves unchanged the aggregate amount of taxes payable by a mining company.

TREND IN EMPLOYMENT, 1942

(Employment and Payroll Statistics Branch)

GENERAL SUMMARY

In continuing response to the stimulus provided by the industrial war effort, employment reached unprecedentedly high levels in Canada during 1942. The trend was generally favourable during nine of the twelve months, curtailment having been indicated only during the first quarter of the year; the contractions then were moderate. The extent of the general upswing, however, was not equal to that reported in the earlier phases of the expansive movement, which, dating from the outbreak of hostilities, had received great impetus from the events of the spring and early summer of 1940, climaxed by the collapse of France. This slowing down in the rate of acceleration during 1942 was an obvious development in view of the magnitude of the expansion since the beginning of the war, with its consequent depletion of the labour market, seriously affected also by the recruitment of some 600,000 persons by the armed forces. In the 1942 stage of the war, the distribution of the workers taken on differed from that indicated in preceding phases. As shortages of labour and materials became increasingly a problem in industrial organization, the shift of workers from the less-essential to the more-essential production and services assumed an ever-growing importance in the industrial pattern—a transfer which in general was facilitated by relatively high earnings in war plants and other essential industries.

MINING

Mining operations were adversely affected by labour shortages in 1942, in eight months of which employment was in smaller volume than in the same period of 1941. With only one exception, the trend in the group as a whole was unfavourable in each month of the year under review. The index declined from 177.8 at Jan. 1, to 162.7 at the beginning of December, averaging 171.3 in the twelve months; the 1941 mean had been 176.6.

The 80,056 employees reported, on the average, by the 428 co-operating mining operators were shown to have earned a weekly average of \$2,785,432 in 1942. This was a per capita average of \$34.81, which was higher than in any other of the main industrial groups included in the monthly surveys, although it was exceeded by the average in a few manufacturing industries. The index of payrolls rose from 100 at June 1, 1941 to a peak of 112.0 at March 1, 1942, thence declining to 103.8 at November 1. This falling off was accompanied by a loss of eight per cent in employment in the period from June 1, 1941, to November 1, 1942.

Coal mining, on the whole, showed little general change from 1941, the index averaging 94.7 in 1942, as compared with 94.9 in the preceding year. A working force of 26,020 persons was employed, on the average, by the 105 co-operating firms, who had had 26,056 employees in 1941. The reported payrolls in the year under review amounted to \$808,893 per week, a per capita average of \$31.09. At the end of 1942, payrolls in the coal-mining division had risen by 37.6 per cent from June 1, 1941, while employment in the same period had advanced by only 1.1 per cent.

The labour stringency affected particularly metallic ore mining, notably gold. From the first quarter of the year, employment was quieter than in the same period of 1941, and as the year progressed, the comparison with earlier years since 1937 also became favourable. The index averaged 346.1, as compared with 366.2 in 1941 and 350.9 in 1940; these three are the highest in the record. Data were tabulated from 207 employers whose working forces aggregated 43,215, varying from 44,614 at March 1, to 39,963 at the beginning of December. The reported weekly payrolls of persons employed by the co-operating metallic ore mines averaged \$1,668,080, a per capita average of \$38.60. This was exceeded only by the averages in certain iron and steel groups.

Non-metallic minerals, other than coal: This industry provided more employment than in 1941 or earlier years. The reported employees averaged 10,821, earning a weekly payroll of \$308,459. The per capita average was \$28.51. In 1941, the persons on the staffs of the co-operating firms numbered 10,119. The 1942 mean index of employment was 159.4 compared with 150.5 in 1941. Considerable activity was indicated in asbestos mining, quarrying and other divisions of the group.

Table 18.—Per Capita Weekly Average Earnings of Persons Engaged in Mining at Specified Dates in 1941 and 1942*

Industry	Per Capita Averages						
	June 1, 1941	Sept. 1, 1941	Dec. 1, 1941	Mar. 1, 1942	June 1, 1942	Sept. 1, 1942	Dec. 1, 1942
	\$	\$	\$	\$	\$	\$	\$
Coal.....	24.90	28.49	32.62	32.41	29.84	32.27	33.89
Metallic ores.....	35.34	36.89	36.36	37.68	38.68	39.39	38.82
Non-metallic minerals (except coal).....	25.72	26.58	26.73	29.00	28.03	29.28	29.37

*From Annual Review of Employment and Payrolls in Canada, 1942—D.B.S., Ottawa.

Table 19.—Strikes and Lockouts in Canada, by Industries, 1941 and 1942
(Department of Labour)

	1941					1942				
	Number of strikes and lockouts	Workers involved		Time lost		Number of strikes and lockouts	Workers involved		Time lost	
		No.	Per cent of total	Man working days	Per cent of total		No.	Per cent of total	Man working days	Per cent of total
Agriculture.....						2	426	0.3	278	0.1
Logging.....	1	300	0.3	4,000	0.9	5	604	0.5	974	0.2
Fishing and trapping.....						1	3,260	2.9	10,000	2.2
Mining, etc.*.....	48	41,476	47.6	191,689	44.2	61	22,408	19.7	129,529	28.8
Coal mining.....	(45)	(38,136)	(43.8)	(109,069)	(25.1)	(53)	(19,670)	(17.3)	(68,318)	(14.7)
Manufacturing.....	127	36,730	42.2	205,845	47.4	219	80,037	70.3	296,135	65.8
Construction.....	27	5,889	6.0	13,997	3.2	31	3,889	3.4	4,266	1.0
Transportation and Public Util- ities.....	13	1,566	1.8	4,224	1.0	15	2,233	2.0	5,439	1.2
Trade.....	4	193	0.2	760	0.2	4	61	0.0	74	0.0
Finance.....						1	224	0.2	1,100	0.2
Service.....	11	937	1.1	13,399	3.1	15	774	0.7	2,407	0.5
Total.....	231	87,091	100.0	433,914	100.0	354	113,916	100.0	450,202	100.0

*Non-ferrous smelting is included with mining.

Of the total of 354 strikes and lockouts during 1942, 61 were in mining, involving 19.7 per cent of the workers in all strikes. The time loss was 28.8 per cent of the total. Fifty-three strikes were recorded in the coal mining industry and these caused 14.7 per cent of the total time loss in all strikes. Only two strikes were recorded during the year in gold mining but one of these involving 2,800 miners at Kirkland Lake caused a time loss of 58,000 man working days in 1942 and 78,000 days in 1941. About one-half of the time loss due to strikes in coal mining was caused by five disputes. In March a strike at Springhill, Nova Scotia resulted in a loss of 11,500 man working days; two strikes at Florence, Nova Scotia in April caused a total loss of about 12,000 days and two strikes in British Columbia in October, one at Nanaimo and the other at Cumberland caused a loss of 9,500 days.

Table 20.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1942

Province	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total†	Salaries	Wages	Total
	Male	Female	Male	Female				
Nova Scotia.....	503	145	13,744	2	14,394	1,329,450	20,839,603	22,169,053
New Brunswick.....	75	26	1,599	18	1,718	195,979	1,659,819	1,855,798
Quebec.....	2,315	546	24,306	68	27,235	5,206,827	37,694,618	42,901,445
Ontario.....	3,252	557	32,801	256	36,806	9,811,884	63,086,277	72,898,161
Manitoba.....	239	37	2,224	12	2,512	639,678	3,960,493	4,600,171
Saskatchewan.....	276	56	2,116	2	2,450	752,971	3,648,210	4,401,181
Alberta.....	1,132	218	9,936	100	11,446	2,869,388	16,758,717	19,628,105
British Columbia.....	1,417	338	12,429	139	14,323	3,948,086	23,218,910	27,166,996
Yukon.....	40	4	354	.....	398	145,094	1,076,858	1,221,952
Northwest Territories.....	101	15	584	1	701	299,495	1,437,903	1,737,398
Canada.....	9,350	1,942	100,093	658	112,043	25,198,852	173,351,408	198,550,260

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous years, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

Table 21.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1942

Industry	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
METAL MINING						\$	\$	\$
Alluvial Gold Mines.....	43	7	421	.....	471	128,714	1,154,560	1,283,274
Auriferous Quartz Mines.....	2,275	238	23,456	61	26,030	6,979,330	47,409,542	54,388,872
Copper-Gold-Silver Mines..	515	115	5,016	.....	5,646	1,547,826	9,549,586	11,097,412
Silver-Cobalt Mines.....	24	3	165	.....	192	63,722	220,258	283,980
Silver-Lead-Zinc Mines†.....	231	27	1,877	.....	2,185	711,770	4,018,660	4,730,370
Nickel-Copper Mines.....	345	23	6,779	.....	7,147	1,124,038	14,241,169	15,365,207
Miscellaneous Metal Mines.....	169	22	1,161	.....	1,352	286,932	2,109,799	2,396,731
Non-ferrous Smelting and Refining.....	1,978	647	18,352	185	21,162	5,286,755	32,053,801	37,340,556
NON-METAL MINING, INCLUDING FUELS								
Coal.....	1,223	208	24,763	11	26,205	3,141,599	38,949,538	42,091,137
Natural gas.....	805	227	901	7	1,940	1,696,659	1,130,152	2,826,811
Petroleum.....	371	113	1,483	5	1,972	997,609	2,651,356	3,648,965
OTHER NON-METALLIC MINING								
Asbestos.....	269	60	3,420	.....	3,749	731,836	4,567,618	5,299,454
Feldspar and Quartz (a).....	41	5	487	.....	533	91,267	691,636	782,903
Gypsum.....	46	9	451	4	510	106,477	551,143	657,620
Iron Oxides.....	4	2	41	.....	47	9,174	35,114	44,288
Mica.....	28	7	250	76	361	45,145	213,460	258,605
Peat (b).....	43	26	1,131	116	1,316	113,781	1,266,361	1,380,142
Salt.....	86	48	509	32	675	337,050	777,524	1,114,574
Talc and Soapstone.....	7	1	107	.....	115	22,729	90,872	113,601
Miscellaneous.....	76	12	723	.....	811	142,266	999,806	1,142,072
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS								
Cement.....	79	10	1,152	.....	1,241	200,779	1,858,558	2,059,337
Clay Products.....	227	54	2,082	160	2,523	590,545	2,452,466	3,073,011
Lime.....	80	18	924	.....	1,023	161,777	1,150,543	1,312,320
Sand and Gravel.....	97	16	2,027	1	2,141	224,868	2,179,887	2,404,755
Stone.....	238	44	2,415	.....	2,697	456,204	2,998,059	3,454,263
Total.....	9,350	1,942	100,093	658	112,043	25,198,852	173,351,408	198,550,260

*See footnote, preceding table.

†Includes pitchblende-silver mines.

(a) Includes nepheline-syenite mines.

(b) Includes fuel, moss and humus.

Table 22.—The Number of Wage-Earners in the Canadian Mining Industry, 1942, who Worked the Number of Hours Specified, during One Week in Month of Highest Employment

	30 hours or less	31-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-54 hours	55 hours	56-64 hours	65 hours and over	Grand total	Total wages paid in that week*
By provinces—												\$
Nova Scotia.....	112	318	46	312	14,287	30	284	34	896	100	16,399	486,779
New Brunswick.....	98	151	34	38	2,556	53	258	4	175	52	3,419	59,137
Quebec.....	902	1,110	240	395	18,286	1,347	1,919	928	4,535	1,526	31,188	943,796
Ontario.....	849	1,235	201	1,761	22,967	701	2,253	226	6,065	1,518	38,376	1,405,835
Manitoba.....	88	107	153	84	1,828	100	342	37	737	123	3,549	114,690
Saskatchewan.....	133	123	159	47	1,019	80	300	113	598	183	2,755	96,457
Alberta.....	237	531	361	253	8,921	492	776	44	470	64	12,149	449,630
British Columbia.....	341	251	247	171	13,047	84	356	88	1,977	234	16,796	561,870
Yukon.....									579	65	644	38,870
Northwest Territories.....	39	28	6	4	275	8	12		346	74	792	25,893
Canada.....	2,799	3,854	1,447	3,015	83,186	2,895	6,480	1,474	16,978	3,939	126,067	4,182,957
By Industries—												
METAL MINING												
Alluvial Gold Mines.....	2	4	2		106						759	42,843
Auriferous Quartz Mines.....	644	1,036	104	109	15,158	296	2,000	14	541	90	28,174	1,058,196
Copper-Gold-Silver Mines.....	225	306	186	99	3,481	125	638	86	528	130	5,804	217,838
Silver-Cobalt Mines.....	6	27		7	120	2	8		33	29	232	6,524
†Silver-Lead-Zinc Mines.....	32	47	1	29	1,719	33	55	2	59	42	2,551	104,247
Nickel-Copper Mines.....	41	90	3	566	6,597	30	111	4	106	16	7,564	314,662
Miscellaneous Metal Mines.....	158	120	30	15	491	39	158	15	739	214	1,979	59,983
Non-Ferrous Smelting and Re- fining.....	421	428	183	957	17,204	196	701	63	1,638	279	22,070	734,106
NON-METAL MINING, INCLUDING FUELS												
Coal.....	297	756	206	455	24,299	502	487	62	1,380	69	28,513	972,502
Natural gas.....	115	26	168	52	250	21	234	9	186	95	1,156	27,441
Petroleum.....	77	128	17	24	1,327	7	79	14	154	34	1,861	55,309
OTHER NON-METAL MINING												
Asbestos.....	2			2	2,598	744	4	1	179	64	3,594	100,794
Feldspar and Quartz.....	47	33		28	173	11	45	6	161	104	608	16,412
Gypsum.....	48	63	27	16	138	32	105	21	138	99	687	17,041
Iron Oxides.....					35				13		48	874
Mica.....	8	30	19	10	199	123	22	29	14	12	466	7,515
Peat (a).....	263	135	134	139	1,780	58	137	21	206	127	3,000	54,513
Salt.....	26	59	27	29	156	31	47	11	128	76	590	17,547
Talc and Soapstone.....	3	4		1			85	2	25	32	153	2,494
Miscellaneous.....	65	63	22	33	119	29	138	30	277	278	1,054	20,074
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS												
Cement.....	15	55	35	27	426	62	88	21	414	106	1,249	30,916
Clay Products.....	66	90	60	198	527	408	614	117	612	156	2,848	64,419
Lime.....	18	52	49	6	205	10	128	62	331	99	960	26,601
Sand and Gravel.....	16	37	24	19	5,630	17	93	16	453	241	6,546	115,548
Stone.....	204	265	149	135	447	119	413	257	1,004	608	3,601	99,463
Total.....	2,799	3,854	1,447	3,015	83,186	2,895	6,480	1,474	16,978	3,939	126,067	4,182,957

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

*Includes the actual money wages paid, the value of room and board where provided, deductions from employees for social services, such as sickness, accident, insurance, pensions, etc., as well as any other allowance forming part of the employees' wages, includes overtime.

(a) In all forms.

Table 23.—Employees and Salaries and Wages Paid in Canadian Mining Industry, 1930-1942

Year	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	15,484	19,284,197	1,391	1,132,306	15,397	15,190,714	24,706	34,433,915	3,021	4,372,044	1,371	1,040,790
1931.....	14,871	15,302,444	1,197	1,048,860	11,141	12,666,586	20,277	30,470,475	2,059	3,096,332	1,092	896,131
1932.....	13,706	11,302,801	1,480	1,123,080	7,694	8,198,379	16,376	24,412,126	1,730	2,106,017	924	748,782
1933.....	13,915	9,852,765	1,629	1,402,114	8,629	8,621,984	17,306	25,600,168	1,379	1,847,251	1,265	1,111,001
1934.....	13,500	13,594,114	1,722	1,276,770	10,362	10,492,169	22,033	32,619,846	1,948	2,796,454	1,461	1,257,282
1935.....	14,550	14,301,510	2,390	1,865,407	11,811	12,794,600	25,264	38,152,140	2,346	3,403,649	1,457	1,343,041
1936.....	15,368	15,980,687	1,744	1,248,431	14,225	15,774,362	31,105	46,899,805	2,932	3,752,367	1,828	1,937,825
1937.....	15,629	18,373,958	3,012	1,509,063	19,121	22,708,131	36,238	58,891,339	3,159	4,301,366	2,307	2,372,443
1938.....	15,591	15,959,095	3,042	2,074,273	20,829	24,485,254	35,791	58,926,900	2,840	4,393,270	2,287	2,470,530
1939.....	15,202	17,371,518	3,263	2,311,835	20,872	25,689,382	37,233	63,220,042	3,027	4,541,992	2,026	2,347,264
1940.....	14,934	19,285,662	2,240	1,939,160	21,726	29,025,418	38,774	66,395,845	3,145	5,107,054	1,961	2,573,878
1941.....	15,246	21,388,809	2,262	2,097,842	23,149	34,008,021	40,496	74,902,555	3,101	5,312,075	1,977	3,105,529
1942.....	14,394	22,169,053	1,718	1,855,798	27,235	42,901,445	36,866	72,868,161	2,512	4,600,171	2,450	4,401,181

Year	Alberta		British Columbia		Yukon		Northwest Territories		Canada	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	12,675	16,272,916	14,836	21,412,925	319	835,525	.....	.....	89,200	113,975,332
1931.....	10,579	11,357,722	11,297	16,345,887	296	784,862	.....	.....	72,809	91,969,299
1932.....	9,692	10,476,449	9,565	12,612,151	286	761,585	17	30,679	61,470	71,772,049
1933.....	9,057	9,463,382	9,845	11,455,946	233	545,692	76	131,502	63,334	70,031,805
1934.....	9,843	9,792,297	12,270	15,482,102	286	660,814	80	154,338	73,505	88,126,186
1935.....	9,706	10,862,198	12,352	16,479,606	333	809,067	47	69,341	80,256	100,080,559
1936.....	10,376	11,850,463	12,827	17,908,553	566	1,372,917	28	40,812	90,999	116,766,222
1937.....	10,843	12,924,934	14,282	21,487,277	691	1,502,692	132	221,181	105,414	144,292,384
1938.....	10,612	12,811,975	15,179	21,975,143	794	1,962,941	310	584,619	107,275	145,644,000
1939.....	10,548	13,097,818	14,587	21,698,690	728	1,605,671	273	468,996	107,759	152,353,208
1940.....	10,628	14,535,789	14,420	23,227,719	617	1,518,747	441	880,414	108,886	164,489,686
1941.....	11,141	17,065,351	14,801	25,797,418	501	1,570,683	553	1,174,903	113,227	186,423,186
1942.....	11,435	19,628,105	14,323	27,166,996	398	1,221,952	701	1,737,398	112,032	198,550,260

Table 24.—Wage-earners on Surface, Underground and in Mill, 1942

Province	Metal Mines			Fuels			Other†		
	Surface (a)	Under- ground	Mill	Surface	Under- ground	Mill	Surface	Under- ground	Mill
Nova Scotia.....	39	81	13	2,116	10,450	.....	863	52	132
New Brunswick.....	3	.....	.....	390	714	.....	455	24	31
Quebec.....	10,656	4,812	797	.....	.....	.....	4,984	757	2,368
Ontario.....	11,717	15,611	1,610	815	.....	.....	2,773	90	441
Manitoba.....	823	649	110	1	2	.....	537	15	99
Saskatchewan.....	589	541	158	252	340	.....	111	.....	127
Alberta.....	.....	.....	.....	3,567	5,840	.....	580	.....	98
British Columbia.....	4,641	2,841	945	689	1,881	.....	1,440	.....	131
Yukon.....	53	24	277	.....	.....	.....	.....	.....	.....
Northwest Territories..	203	221	59	102	.....	.....	.....	.....	.....
Total, 1942.....	28,724	24,780	3,969	7,932	19,227	.....	11,743	938	3,427
Total, 1941.....	25,940	28,388	4,198	7,902	19,608	.....	12,915	923	3,208
Total, 1940.....	23,525	27,575	3,833	8,040	19,859	.....	12,979	775	2,958
Total, 1939.....	23,018	26,530	3,750	8,037	19,861	.....	11,406	857	5,766
Total, 1938.....	23,326	24,754	3,713	8,277	20,260	.....	15,808	678	1,894

†Includes asbestos, salt, gypsum, stone quarries, brick plants, etc., etc.

(a) Including non-ferrous smelters and refineries.

Table 25.—Fuel and Electricity Used for All Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian Imported		From United States	From other countries					
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.	lb.
METAL MINING									
Alluvial Gold.....Quantity	1	20				3	30,041	680	
\$	26	1,678				313	27,111	610	
Auriferous Quartz.....Quantity	23,628	26,102	2,770	305	189	76	367,935	15,433	
\$	241,514	285,732	34,781	6,112	947	1,963	136,478	4,149	
Copper-Gold-Silver.....Quantity	16,779	22,127	94	66	82,109	523	71,734	7,643	
\$	113,462	22,585	2,063	1,344	204,038	7,767	24,801	1,951	
Silver-Cobalt.....Quantity	4	1,171	159	31		10	5,910	10	
\$	58	18,408	2,711	554		200	2,257	4	
Silver-Lead-Zinc.....Quantity	50,602	386	270		501	291	37,976	1,312	
\$	231,111	4,400	2,934		3,795	2,041	14,186	445	
Nickel-Copper.....Quantity		14,027	84			19	60,779	3,453	
\$		105,217	1,246			261	15,784	781	
Miscellaneous Metals...Quantity	417	583	43		5	23,683	91,126	662	
\$	4,188	5,937	678		65	94,202	29,079	204	
Non-Ferrous Smelting and Refining.....Quantity	394,766	642,930	72	40		373,995	368,842	10,668	853,565
\$	2,786,251	4,807,739	1,065	436		4,111,282	126,522	2,327	12,883
Total.....Quantity	486,197	687,346	3,492	442	82,804	398,600	1,034,343	39,861	853,565
\$	3,376,610	5,251,636	45,478	8,446	208,845	4,218,029	376,218	10,471	12,883
NON-METAL MINING Fuels									
Coal.....Quantity	554,394				53,172		152,280	3,117	
\$	1,723,568				55,010		42,898	895	
Natural Gas.....Quantity	16	181	8				75,496	845	
\$	198	1,506	135				18,216	171	
Petroleum.....Quantity	1,305		3		3	2	115,707	2,902	
\$	7,687		33		16	25	32,952	459	
Total.....Quantity	655,715	181	11		53,175	2	343,489	6,864	
\$	1,731,453	1,506	168		56,026	25	94,066	1,525	
Other Non-Metal Mining									
Asbestos.....Quantity	2,242	27,903	20,801	3,491			120,465	6,743	
\$	20,420	253,966	183,366	31,983			37,247	1,209	
Feldspar, nepheline....Quantity	1,064	3,591	1,437	1		10	69,170	779	
\$	8,992	26,240	15,585	15		141	19,543	167	
Gypsum.....Quantity	8,416	3,000			946	340	53,716	245	
\$	59,696	22,125			3,719	8,738	12,894	53	
Iron Oxides.....Quantity	22		8			3	873	129	
\$	214		128			36	277	24	
Mica.....Quantity	1	90	34				29,635	327	
\$	11	919	538				9,600	89	
Peat.....Quantity							49,018	448	
\$							12,611	93	
Salt.....Quantity	29,121	40,599			22,400		51,548	39	
\$	166,958	253,367			80,261		14,477	11	
Talc and Soapstone....Quantity	3						17,194	187	
\$	30						5,237	39	
Miscellaneous.....Quantity	15,944	22,523	38		19,595	1	135,943	2,046	
\$	82,344	186,145	611		57,307	12	37,737	392	
Total.....Quantity	66,813	97,706	22,318	3,492	42,941	354	527,562	10,943	
\$	338,665	742,762	200,228	31,993	141,287	8,927	149,623	2,067	
STRUCTURAL MATERIALS AND CLAY PRODUCTS									
Cement.....Quantity	156,544	192,105					152,146	5,121	
\$	1,003,490	1,305,333					41,295	972	
Clay Products.....Quantity	32,816	80,231	228	375	1,961	363	140,979	1,698	
\$	228,437	677,900	2,229	2,526	4,814	3,687	42,324	324	
Lime.....Quantity	143,049	84,895	10,043		85	20,654	105,355	123	
\$	1,194,675	531,279	87,135		333	190,863	30,984	80	
Sand and Gravel.....Quantity	4,882	12,767	5			22	746,874	3,394	
\$	40,602	93,818	75			373	265,603	840	
Stone.....Quantity	2,518	10,058	131	5		305	770,971	6,079	
\$	23,270	82,175	1,827	70		3,234	226,124	1,098	
Total.....Quantity	339,809	380,056	10,407	380	2,046	21,344	1,916,325	16,415	
\$	2,490,474	2,690,555	91,266	2,596	5,147	198,157	606,330	3,264	
Grand Total.....Quantity	1,438,534	1,165,289	36,228	4,314	180,966	420,300	3,821,719	74,083	853,565
\$	7,937,202	8,686,519	337,140	43,040	411,305	4,420,138	1,226,237	17,327	12,883

(a) On outgoing shipments only.

(b) Paid by mine operator only.

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in the Mineral Industry in Canada, by Kinds and Industries, 1942

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplied	Freight (a)	Treatment charges (b)
Imp. gal.	Cords	Manu- factured	Natural	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
77,518	2,207						24,624,400	4,169,616			
38,645	34,941					103,324		33,887	37,343	31,367	34,601
4,223,366	69,649				846,900,417		89,178,074	7,443,138			
627,029	419,700			390	5,856,971	7,615,766		112,946	17,922,522	741,329	2,346,264
945,156	677				259,346,497		86,704,181	10,554,637			
104,851	4,187			948	850,740	1,338,737		94,994	5,703,455	1,932,958	26,483,990
6,700	251				2,730,920						
1,009	1,685			13,828	27,635	68,349			64,000	1,439	16,255
923,479	1,620				62,863,531		37,866,247	11,217			
157,673	12,247				362,940	791,772		4,239	1,163,819	1,662,341	650,420
835,387	424				149,703,687		17,520				
87,980	1,926				502,209	715,404			7,471,373		
1,062,104	22,912				16,948,678		2,160,000				
157,684	195,548				136,080	623,665			600,900	261,211	33,910
39,766,900	6,192	3,138	429		8,287,760,845		259,823,581	23,473,768			
2,600,583	27,847	3,207	348		21,268,149	35,748,639		93,691	27,083,695		
47,840,610	103,932	3,153	429		9,626,254,575		500,374,003	45,652,376			
8,775,454	698,081	3,207	348	15,166	20,004,724	47,005,656		339,737	60,047,107	4,630,645	29,565,448
92,234	3				170,852,010		50,819,799	6,912,607			
15,507	3				1,871,431	3,710,312		111,313	7,255,640		
660	50		185,751		27,480						
77	200		69,675	1,155	1,156	92,489			12,313		
104,875	304		7,998,351		2,005,823						
11,455	917		886,634	676	30,650	971,504			235,959		
197,769	357		8,184,108		172,885,313		50,819,799	6,912,607			
27,039	1,120		956,309	1,831	1,903,237	4,774,508		111,313	7,503,912		
54,490					147,922,370				2,747,682		
9,937					1,108,163	1,646,291					
191,536	458				3,619,708		1,753,959				
22,051	2,060				29,316	124,100			287,928		
84,496	61		5,488		12,022,863		1,467,344				
9,195	306		2,196		64,760	178,682			65,457		
1,258	3,358				200,000				5,780		
252	16,790				3,114	20,835					
1,552	491				318,710		1,350				
179	2,372				4,444	18,152			19,161		
7,776	654				379,781						
1,491	1,969				9,702	25,866			13,499		
15,482			66		3,610,719		7,502,246				
1,775			36		19,764	536,649			133,783		
3,940	68				1,648,880						
851	339				19,409	25,905			33,208		
3,398,374	3,391	176,571			5,968,148		1,722,009				
191,319	9,365	21,012			70,294	656,538			296,322		
5,758,704	8,481	176,571	5,554		175,691,179		12,446,908				
237,050	33,201	21,012	2,232		1,328,966	3,233,018			3,602,820		
40,212	19				154,502,140						
4,946	86				771,092	3,127,264			1,024,057		
333,410	27,202	803	475,584		11,581,782		364,768				
28,835	126,180	321	15,720	555	158,521	1,292,373			158,866		
645,325	59,668				15,703,933		1,603,415				
31,381	258,322			935	95,355	2,421,292			177,268		
201,426	303		49		6,587,012		150,000				
39,367	1,840		23		66,649	509,190			167,959		
300,075	1,805		1,000		23,451,322		269,040				
39,122	9,740		696		285,544	672,900			844,269		
1,520,448	88,997	803	476,633		211,826,159		2,387,223				
143,651	396,168	321	16,439	1,490	1,377,161	8,023,019			2,372,419		
53,317,531	201,767	180,512	8,666,718		10,186,657,256		566,027,933	52,564,983			
4,183,194	1,128,570	24,540	975,323	18,487	33,614,088	63,035,993		451,050	73,526,258	4,630,645	29,565,448

Table 26.—Fuel and Electricity Used for All Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian Imported		From United States	From other countries					
	Tons	Tons							
Nova Scotia.....Quantity	397,256					4,951	133,772	251	
\$	1,472,602					29,548	34,020	53	
New Brunswick.....Quantity	15,905						57,377	16	
\$	103,189						14,139	4	
Quebec.....Quantity	436,388	273,681	34,282	3,882		4,789	1,447,112	22,058	92,000
\$	3,548,539	2,330,320	309,587	34,744		61,709	496,147	4,530	1,585
Ontario.....Quantity	47,865	891,490	1,859	321	1	330,959	1,236,366	31,622	761,565
\$	371,776	6,352,825	25,646	5,612	9	3,582,486	361,599	7,373	11,298
Manitoba.....Quantity	73,652	83	17		23,534	95	147,517	2,651	
\$	602,093	984	361		84,535	1,356	60,419	783	
Saskatchewan.....Quantity	32,891		67		50,600	380	136,338	3,022	
\$	217,396		1,446		90,151	5,424	43,601	832	
Alberta.....Quantity	178,773				24,027		195,831	5,887	
\$	470,541				27,765		51,757	1,277	
British Columbia.....Quantity	255,798	14	3	111	82,804	79,123	413,375	7,587	
\$	1,150,577	552	100	2,684	208,845	739,302	125,626	1,653	
Yukon.....Quantity		21				3	23,944	788	
\$		1,838				313	29,645	712	
Northwest Territories.....Quantity	6						30,087	201	
\$	489						15,284	110	
Canada.....Quantity	1,438,534	1,165,289	36,228	4,314	180,966	420,300	3,821,719	74,083	853,565
\$	7,937,202	8,686,519	337,140	43,040	411,305	4,420,138	1,226,237	17,327	12,883

(a) On outgoing shipments only.

(b) Paid by mine operator only.

Table 27.—Fuel and Electricity Used only for Metallurgical

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke	Charcoal
	Canadian	Imported	From United States	From Other Countries			
	Tons	Tons	Tons	Tons			
Quebec.....Quantity	204,510	89,294				4,465	92,000
\$	1,685,344	794,946				58,381	1,585
Ontario.....Quantity		499,809	69	40		290,461	761,565
\$		3,610,463	1,020	436		3,313,101	11,298
Manitoba.....Quantity	43,700						
\$	355,097						
Saskatchewan.....Quantity	14,566						
\$	118,366						
British Columbia.....Quantity	100,803					77,811	
\$	482,194					727,545	
Canada.....Quantity	363,579	589,103	69	40		372,737	853,565
\$	2,641,001	4,405,409	1,020	436		4,099,027	12,883

*All used in the non-ferrous smelting and refining industry and included in table 26.

in the Mineral Industry in Canada, by Provinces, 1942

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplied	Freight (a)	Treatment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	M cu.ft.	M cu.ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
147,267	955	176,571	.....	.....	108,902,420	.....	27,225,724	3,610,168	.....	.....	.....
18,042	3,376	21,012	.....	.....	1,162,425	2,741,078	.....	30,686	3,797,287	1,999	4,623
13,908	14,589	.....	44,346	.....	2,946,568	.....	1,147,856	.....	.....	.....	.....
1,409	55,563	.....	17,950	935	54,794	247,983	.....	.....	153,772	2,279	.....
24,105,421	62,513	3,138	.....	.....	7,035,878,451	.....	266,959,376	22,797,400	.....	.....	.....
1,672,960	302,930	3,207	.....	.....	19,652,978	28,419,236	.....	87,812	26,951,269	1,375,554	14,636,712
19,740,511	52,984	803	89,806	.....	1,650,179,016	.....	25,489,832	676,368	.....	.....	.....
1,515,999	265,691	321	48,238	15,003	7,602,022	20,165,898	.....	5,879	29,187,520	430,937	1,194,685
144,259	16,349	.....	.....	.....	274,792,229	.....	10,506,510	.....	.....	.....	.....
30,417	93,884	.....	.....	189	483,075	1,358,096	.....	.....	1,982,791	297,781	2,795,242
3,423,600	156	.....	.....	.....	172,246,120	.....	14,842,118	.....	.....	.....	.....
203,065	1,463	.....	.....	759	191,615	755,752	.....	.....	2,044,162	1,785	8,143,735
109,424	3,236	.....	8,532,566	.....	55,704,759	.....	10,218,753	241,447	.....	.....	.....
12,175	14,124	.....	909,140	656	587,485	2,074,920	.....	34,464	2,504,197	.....	.....
5,301,516	40,476	.....	.....	.....	879,220,156	.....	170,676,562	14,139,389	.....	.....	.....
606,328	256,787	.....	.....	945	3,776,886	6,870,285	.....	149,969	6,170,224	2,409,822	2,671,960
199,317	2,432	.....	.....	.....	481	.....	26,126,742	4,180,833	.....	.....	.....
88,939	38,427	.....	.....	.....	48	153,922	.....	38,106	97,200	85,947	78,513
132,308	8,077	.....	.....	.....	6,787,055	.....	12,834,460	6,919,378	.....	.....	.....
33,860	96,325	.....	.....	.....	102,760	248,828	.....	104,134	637,836	24,541	39,978
53,317,531	201,767	180,512	8,666,718	.....	10,186,657,256	.....	566,027,933	52,564,983	.....	.....	.....
4,183,194	1,128,570	24,540	975,328	18,487	33,614,088	63,035,998	.....	451,050	73,526,258	4,630,645	29,565,448

Purposes in the Mineral Industry of Canada, by Provinces, 1942*

Gasolene	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other	Electricity	Total	Electricity generated own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
4,619	1,766	22,079,695	4,338	3,138	.....	.....	6,231,003,701	.....	249,908,225
1,670	406	1,382,442	13,858	3,207	.....	.....	15,172,120	19,113,959	.....
39,218	279	16,204,422	111	.....	429	.....	270,253,874	.....	.....
10,865	74	1,050,207	788	.....	348	.....	871,774	8,870,374	.....
.....	.....	13,352	140	.....	.....	.....	177,652,808	.....	.....
.....	.....	2,139	969	.....	.....	.....	119,693	477,898	.....
.....	.....	4,450	46	.....	.....	.....	59,217,602	.....	.....
.....	.....	713	322	.....	.....	.....	39,897	159,298	.....
104,531	.....	1,286,472	1,052	.....	.....	.....	701,405,189	.....	.....
35,350	.....	144,275	7,652	.....	.....	.....	2,702,664	4,099,683	.....
148,368	2,045	39,588,391	5,687	3,138	429	.....	7,439,533,174	.....	249,908,225
47,885	480	2,579,779	23,599	3,207	348	.....	18,906,148	32,721,212	.....

Table 28.—Electricity Purchased by

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1925.....	160,192,738	1,413,861	612,062,882	3,542,342	944,819,733	6,927,280
1926.....	169,287,220	1,547,152	1,215,488,195	4,992,979	1,604,089,435	8,780,863
1927.....	221,866,174	1,742,860	1,490,457,194	5,509,534	1,799,505,643	8,025,375
1928.....	224,756,744	2,002,062	1,530,612,608	6,271,434	1,856,391,170	9,072,073
1929.....	233,219,275	1,983,959	1,662,142,083	6,934,286	2,054,411,658	10,353,034
1930 (a).....	213,116,298	1,927,268	1,752,490,909	7,535,324	2,151,082,619	10,929,340
1931 (b).....	253,436,606	2,222,870	1,874,324,568	7,309,118	2,213,264,599	10,514,814
1932.....	314,326,323	2,516,897	1,499,911,795	6,626,600	1,758,083,427	9,615,706
1933.....	317,650,168	2,661,852	1,688,075,040	7,115,894	1,908,779,501	9,966,904

* Includes service charges.

(a) 1925 to 1930 for power only.

(b) 1931-1941 for all purposes.

ORDINARILY IN USE

Table 29.—Power Equipment in Use, and Power Equipment in

Province	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power em- ployed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No.	56	22	81	3	162	947	1,109	202	83
H.P.	50,710	2,444	5,847	565	69,568	64,603	124,169	11,902	25,036
New Brunswick.....No.	20	1	43	.....	64	257	321	18	20
H.P.	1,890	60	1,296	.....	3,246	2,254	5,500	270	1,365
Quebec.....No.	38	84	251	15	388	9,066	9,454	813	128
H.P.	10,293	12,213	9,351	52,658	84,515	270,124	354,639	11,218	26,108
Ontario.....No.	130	56	808	4	998	13,381	14,379	682	238
H.P.	12,052	6,410	20,624	2,350	41,436	410,499	451,935	12,569	29,607
Manitoba.....No.	5	6	39	1	51	1,335	1,386	172	26
H.P.	1,978	824	973	1,900	5,675	70,980	76,655	3,527	3,009
Saskatchewan.....No.	9	21	52	1	83	1,429	1,512	251	13
H.P.	655	2,162	1,581	3,300	7,698	68,159	75,857	5,514	2,674
Alberta.....No.	194	18	183	.....	395	1,607	2,002	279	222
H.P.	37,664	1,281	6,306	.....	45,251	43,483	88,734	6,516	24,619
British Columbia.....No.	94	85	140	57	376	4,448	4,824	1,654	64
H.P.	37,826	14,419	4,619	36,292	93,168	161,405	254,561	43,954	12,307
Yukon.....No.	.....	12	.....	3	15	.....	15	362	1
H.P.	.....	1,748	.....	15,000	16,748	.....	16,748	16,683	60
N.W.T.....No.	.....	6	7	1	14	139	153	168	9
H.P.	.....	679	113	4,700	5,492	2,034	7,526	2,798	645
Canada.....No.	546	311	1,604	85	2,546	32,609	35,155	4,601	894
H.P.	153,068	42,240	50,710	116,765	362,783	1,093,541	1,456,324	114,951	125,430

Canadian Mining Industry, 1925-1942

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1934.....	415,570,323	3,091,147	2,099,586,731	8,433,428	2,359,525,280	11,510,481
1935.....	464,146,582	3,722,163	2,320,385,917	9,415,062	2,591,470,745	12,546,298
1936.....	449,026,003	4,345,066	2,841,045,187	10,783,296	3,151,192,519	14,055,915
1937.....	629,083,378	5,031,691	3,368,047,901	12,442,423	3,744,919,549	16,135,702
1938.....	741,866,953	5,333,427	4,125,037,129	13,917,518	4,441,098,287	17,485,652
1939.....	777,832,223	5,803,160	4,449,477,330	13,060,673	4,817,050,497	18,749,417
1940.....	868,846,323	5,893,562	5,105,497,931	17,005,546	5,569,961,386	21,066,734
1941.....	947,563,696	6,277,626	7,105,275,873	22,373,156	7,630,138,911	26,710,350
1942.....	846,900,417	5,856,971	9,626,254,575	29,004,724	10,186,657,256	33,614,088

IN RESERVE OR IDLE

Reserve or Idle, in the Mineral Industry in Canada, by Provinces, 1942

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
12	6	22		40	44	84	38	13	20
1,773	930	1,281		3,984	1,397	5,381	2,184	4,451	1,973
		5		6	20	25		4	3
		49		49	186	235		165	70
6	17	60	1	84	923	1,007	26	49	154
474	2,397	4,180	125	7,176	25,772	32,948	931	7,631	24,984
19	14	79		112	1,084	1,196	41	48	397
2,339	2,718	5,315		10,372	35,188	45,560	1,169	3,880	86,619
1	2	9		12	79	91	20	8	27
664	386	529		1,579	2,191	3,770	474	868	541
7	5	11		23	119	142	59	10	24
2,644	1,100	430		4,174	2,918	7,092	1,635	1,186	3,251
28	12	19		59	58	117	14	28	42
7,028	210	1,103		8,341	2,443	10,784	357	2,580	3,776
12	17	44	8	81	712	793	99	14	130
11,610	1,578	1,093	9,115	23,396	17,980	41,376	2,348	1,333	37,461
	5	1		6	34	40	54	3	4
	812	28		840	288	1,128	4,313	177	950
	7	1		8	7	15		2	12
	1,297	10		1,307	200	1,507		45	448
85	85	251	9	430	3,080	3,510	351	179	813
26,532	11,428	14,018	9,240	61,218	88,563	149,781	13,411	22,316	160,073

Table 30—Power Equipment in Use and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power em- ployed	Electric motors run by primary power in same plant	Boilers
METAL MINING—									
Alluvial Gold									
Mines.....No.	2	20	23	13	58		58	298	1
H.P.	160	1,567	589	16,012	18,328		18,328	15,675	100
Auriferous Quartz									
Mines.....No.	19	72	55	24	170	9,699	9,869	1,628	184
H.P.	1,663	14,251	3,444	23,680	43,038	254,991	298,029	28,720	16,064
Copper-Gold-Silver									
Mines.....No.	2	12	3	8	25	2,418	2,443	769	30
H.P.	17,333	3,585	127	11,200	32,245	101,012	133,257	21,724	6,199
Silver-Cobalt									
Mines.....No.	1		2		3	43	46		3
H.P.	175		35		210	1,204	1,414		145
Silver-Lead-Zinc									
Mines.....No.	4	24	13	9	50	816	866	458	14
H.P.	6,040	4,044	226	1,350	11,660	19,180	30,840	11,683	2,619
Nickel-Copper									
Mines.....No.		1	1		2	902	904		4
H.P.		150	4		154	37,775	37,929		380
Miscellaneous Metal									
Mines.....No.		20	31		51	188	239	80	14
H.P.		2,748	1,073		3,821	6,095	9,916	896	995
Non-ferrous Smelting and Refining....No.	34	7	318	11	370	10,268	10,638	338	45
H.P.	14,836	1,430	2,367	51,125	69,768	368,365	438,123	4,448	27,763
Total.....No.	62	156	446	65	729	24,334	25,063	3,571	295
H.P.	40,207	27,775	7,865	103,367	179,214	788,622	967,836	83,146	54,265
NON-METAL MINING, INCLUDING FUELS—									
Coal.....No.	234	9	199	2	444	2,788	3,232	417	211
H.P.	75,598	746	4,116	12,000	92,460	107,114	199,574	22,777	43,621
Natural Gas.....No.	8		246		254	96	350	11	9
H.P.	265		8,659		8,924	1,070	9,994	185	360
Petroleum.....No.	71	15	103		189	170	359	15	108
H.P.	23,677	1,189	4,490		29,266	1,061	30,417	817	9,617
Total.....No.	313	24	548	2	887	3,054	3,941	443	328
H.P.	99,540	1,935	17,265	12,000	130,740	109,245	239,985	23,279	53,598
Other Non-Metal Mining									
Asbestos.....No.	6	1	14		21	1,076	1,097		3
H.P.	210	120	1,148		1,478	53,276	54,754		80
Feldspar, nepheline syenite and quartz No.	8	7	27		42	98	140	113	9
H.P.	508	942	1,361		2,811	2,189	5,000	1,167	670
Gypsum.....No.	7	16	33		66	170	226	42	6
H.P.	1,270	2,078	1,775		5,183	5,727	10,850	1,016	770
Iron Oxides.....No.									
H.P.									
Mica.....No.	1		22		23	86	86		
H.P.	50		1,521		1,571	145	1,716	5	3
Peat.....No.	1	1	76		78	62	140	25	100
H.P.	50	115	1,999		2,164	776	2,940		
Salt.....No.	29		5		34	144	178	213	9
H.P.	4,668		138		4,806	976	5,782	2,174	4,720
Talc and Soap- stone.....No.		2	14		16	36	52		
H.P.		78	450		528	682	1,210		
Miscellaneous.....No.	6	17	29	2	64	232	286	72	13
H.P.	308	1,663	1,159	350	3,480	4,355	7,835	1,016	1,151
Total.....No.	58	44	220	2	324	1,832	2,156	445	43
H.P.	7,064	4,996	9,551	350	21,961	68,212	90,173	5,398	7,491

Reserve or Idle, in the Mineral Industry in Canada by Industries, 1942.

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
.....	2	9	1	12	.....	12	52	.....	.....
.....	91	137	10	238	.....	238	4,300	.....	.....
9	43	105	1	158	770	928	78	67	367
1,547	6,802	7,650	780	16,779	22,316	39,095	1,801	4,241	15,843
7	2	2	4	15	154	169	58	15	107
12,708	450	345	7,950	21,453	3,090	24,543	3,464	1,334	13,665
.....	1	.....	.....	1	17	18	.....	.....	.....
.....	120	.....	.....	120	441	561	.....	.....	.....
.....	9	6	2	17	132	149	10	6	30
.....	982	515	375	1,872	4,250	6,122	93	317	3,972
.....	.....	.....	.....	.....	68	68	.....	1	58
.....	.....	.....	.....	.....	1,943	1,943	.....	100	25,120
3	1	5	.....	9	33	42	1	4	5
377	300	118	.....	796	1,004	1,799	2	400	50
1	1	.....	.....	2	1,240	1,242	31	9	130
1,074	75	.....	.....	1,149	27,149	28,298	354	5,850	91,913
20	59	127	8	214	2,414	2,628	230	102	697
15,706	8,820	8,765	9,115	42,406	60,193	102,539	10,014	12,242	150,563
.....
33	1	28	.....	62	124	186	33	37	66
8,971	80	543	.....	9,694	3,601	13,195	1,916	6,842	7,073
.....	.....	3	3	3	.....	3	.....	.....	1
4	7	15	.....	96	.....	96	.....	.....	2
265	110	959	.....	1,354	15	41	4	8	1
.....	.....	.....	.....	.....	371	1,705	195	505	6
37	8	46	.....	91	139	230	37	45	68
9,236	190	1,598	.....	11,024	3,972	14,996	2,111	7,347	7,081
.....
.....	.....	.....	.....	3	39	39	.....	.....	.....
.....	.....	.....	.....	462	3,254	3,254	.....	.....	.....
.....	2	1	.....	29	8	11	3	1	6
4	422	40	.....	1,600	148	610	12	50	247
130	2	23	.....	.....	20	49	15	4	12
.....	396	1,134	.....	.....	670	2,330	430	355	836
.....
.....	.....	3	1	4	.....	4	2	3	1
.....	73	125	.....	198	.....	198	10	75	12
.....	11	.....	.....	11	1	12	.....	.....	.....
.....	539	.....	.....	539	7	546	.....	.....	.....
7	1	.....	.....	8	3	11	19	7	1
190	180	.....	.....	370	11	381	234	1,135	15
.....	.....	.....	.....	.....	5	5	.....	.....	.....
.....	.....	.....	.....	.....	320	320	.....	.....	.....
1	4	6	.....	11	8	19	33	1	3
35	980	240	.....	1,255	365	1,620	320	20	237
12	9	44	1	66	84	150	72	16	23
355	1,978	2,026	125	4,484	4,775	9,259	1,006	1,635	1,347

Table 30.—Power Equipment in Use, and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power em- ployed	Electric motors run by primary power in same plant	Boilers
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—									
Cement.....No. H.P.		5 1,176	39 1,445		44 2,621	1,479 77,069	1,523 79,690	26 968	9 515
Clay Products...No. H.P.	41 3,542	9 552	46 1,314		96 5,408	486 12,790	582 18,198	24 330	46 4,804
Lime.....No. H.P.	8 260	5 579	25 785		38 1,624	440 7,186	478 8,810	59 896	13 1,593
Sand and Gravel.No. H.P.	16 531	15 890	51 2,007	7 240	89 3,668	215 7,205	304 10,873	8 53	8 520
Stone.....No. H.P.	48 1,924	53 4,337	229 10,478	9 808	339 17,547	769 23,212	1,108 40,759	25 881	62 2,644
Total.....No.	113	87	390	16	606	3,389	3,995	142	138
H.P.	6,257	7,534	16,029	1,048	30,868	127,462	158,330	3,128	10,076
Grand Total 1942..No.	546	311	1,604	85	2,546	32,609	35,155	4,601	804
H.P.	153,068	42,240	50,710	116,765	362,783	1,093,541	1,456,324	114,951	125,430
Grand Total 1941..No.	587	351	1,317	85	2,340	30,032	32,372	4,099	788
H.P.	152,307	45,062	44,568	115,397	357,334	1,219,848	1,577,182	101,001	116,641

WARTIME MINE SHOP ASSOCIATION

Prepared by: Oliver Hall, Chairman, Wartime Mine Shop Association

The work of the Wartime Mine Shop Association has gone steadily on throughout 1942. Orders at the end of 1941 totalled about two million dollars. These orders were largely for engines and pumps for the merchant ships and for units of gun contracts.

These orders were nearly all completed in 1942 and early 1943.

New orders have been taken and the war work in the mine shops is now on a steady basis and totals a large amount per year.

The war pressure on the base metal mines has increased the repair work in their shops and limited the amount of war manufacturing that they can do. The major gold camps, Porcupine and Kirkland Lake, have increased their shops, purchased new equipment and perfected their organization for war work.

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1942—Concluded

IN RESERVE OR IDLE

Steam engines and turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
1		6		7	294	301	6	1	8
50		242		292	13,753	14,045	210	40	701
6	4	11		21	64	85		8	4
605	20	643		1,268	2,489	3,757		700	163
1				1	9	10		3	
25				25	219	244		117	
2		4		6	14	20		2	3
170		250		420	629	1,049		150	52
6	5	13		24	62	86	6	2	10
385	420	494		1,299	2,533	3,832	70	85	166
16	9	34		59	443	502	12	16	25
1,235	440	1,629		3,304	19,623	22,927	280	1,092	1,032
85	85	251	9	430	3,080	3,510	351	179	813
26,532	11,428	14,018	9,240	61,218	88,563	149,781	13,411	22,316	160,073
113	93	283	15	504	2,737	3,241	456	195	
28,969	118,29	14,820	2,450	58,068	93,518	151,586	13,974	23,115	

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production, Prices, Exchange, etc.

Definition of the Industry.—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is designated “The Auriferous Quartz Mining Industry” and in which industry gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of the Canadian Gold Mining Industry.

Output in Canada of fine gold from all primary sources totalled 4,841,306 troy ounces valued at \$186,390,281 in 1942. This represents decreases of 503,873 troy ounces and \$19,399,111 or 9.5 per cent from the all-time high record of 5,345,179 troy ounces and \$205,789,392 in 1941. This decline in Canadian gold production represents the first break in a series of annual increases that had been realized by the Canadian mining industry since 1923 and largely reflects the curtailment in labour, equipment and essential supplies resulting from the increasing intensity of the second World War. Personnel of the auriferous quartz mining industry have entered in considerable numbers the various branches of the armed forces, others have transferred to the mining of base metals, while the manufacture of certain equipment or materials necessary for the development of new gold mines or expansion in the older mines has been considerably restricted or the products of such manufacture diverted to industries considered at the time to be of more vital importance in a total war effort.

The direct result of these war-time changes was reflected in the cessation of mining operations at most of the new properties under development, the closing down of producing mines operating on ore described as marginal in grade, and a decrease in production by some of the more important and long-established mining companies. Labour troubles continuing from 1941 adversely affected production in the Kirkland Lake camp during the early part of 1942, and gold recoveries at a few base metal mines fell off with a reduction in the shipments of copper-gold ores from these particular properties.

Production of gold in Canada in 1942, according to type of deposit or nature of recovery included 80.8 per cent from crude gold bullion bars produced at auriferous quartz or “gold mines”; 12.1 per cent from blister or anode copper; 4.6 per cent from ores, slags, copper-nickel matte, etc., exported; 2.3 per cent from alluvial deposits, and 0.2 per cent from base bullion made chiefly from silver-lead ores.

Reliable data relating to world gold production have been increasingly difficult to obtain since the outbreak of war in 1939. From statistics made available, it is estimated that Canada, as a world gold producer, probably ranked second in 1942. The Union of South Africa ranked a definite first with approximately 14,120,000 troy ounces, while production of the United States, including receipts from the Philippine Islands, was estimated at 3,618,543 troy ounces. Accurate data pertaining to gold production in Russia are unobtainable, but a conjectural total output of 4,000,000 troy ounces was reported for this country in 1940.

Table 31.—Production of New Gold in Canada, by Provinces and Sources, 1941 and 1942
(Gold at \$20·671834 per fine ounce)

	1941		1942	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion.....	19,170	396,279	12,989 *	268,506
Estimated exchange equalization on gold produced.....		341,766		231,570
Total Value—Canadian Funds.....		738,045		500,076
QUEBEC—				
In anode copper, in ores shipped and in gold bullion.....	1,089,339	22,518,635	1,092,388	22,581,663
Estimated exchange equalization on gold produced.....		19,420,917		19,475,275
Total Value—Canadian Funds.....		41,939,552		42,056,938
ONTARIO—				
*Porcupine Area—In gold bullion.....	1,439,149	29,749,849	1,308,590	27,050,955
*Kirkland Lake—In gold bullion (a).....	743,616	15,371,907	756,388	15,635,927
*Other gold mines—In gold bullion.....	933,318	19,293,395	627,646	12,974,594
Copper-nickel and other ores.....	78,225	1,617,054	71,195	1,471,731
Total.....	3,194,308	66,032,205	2,763,819	57,133,207
Estimated exchange equalization on gold produced.....		56,948,653		49,273,825
Total Value—Canadian Funds.....		122,980,858		106,407,032
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	150,553	3,112,207	136,226	2,816,041
Estimated exchange equalization on gold produced.....		2,684,083		2,428,660
Total Value—Canadian Funds.....		5,796,290		5,244,701
SASKATCHEWAN—				
In ores shipped to Canadian smelters, crude placer gold and gold bullion.....	138,015	2,853,023	178,871	3,697,592
Estimated exchange equalization on gold produced.....		2,460,555		3,188,941
Total Value—Canadian Funds.....		5,313,578		6,886,533
ALBERTA—				
In alluvial gold.....	215	4,444	34	703
Estimated exchange equalization on gold produced.....		3,833		606
Total Value—Canadian Funds.....		8,277		1,309
BRITISH COLUMBIA—				
In alluvial gold.....	35,020	723,928	26,323	544,145
In gold bullion.....	351,974	7,275,948	275,178	5,688,434
In base bullion and in slag and ores exported.....	221,209	4,572,795	172,838	3,572,878
Total.....	608,203	12,572,671	474,339	9,805,457
Estimated exchange equalization on gold produced.....		10,843,145		8,456,595
Total Value—Canadian Funds.....		23,415,816		18,262,052
YUKON—				
In alluvial gold.....	70,847	1,464,537	83,198	1,719,855
In ores shipped.....	112	2,315	48	992
Total.....	70,959	1,466,852	83,246	1,720,847
Estimated exchange equalization on gold produced.....		1,265,070		1,484,124
Total Value—Canadian Funds.....		2,731,922		3,204,971
NORTHWEST TERRITORIES—				
In ores shipped.....	(b)421	8,703	723	14,946
In gold bullion produced.....	73,996	1,529,633	98,671	2,039,710
Total.....	74,417	1,538,336	99,394	2,054,656
Estimated exchange equalization on gold produced.....		1,326,718		1,772,013
Total Value—Canadian Funds.....		2,865,054		3,826,669
Total for Canada.....	5,345,179	110,494,653	4,841,306	100,078,674
Total estimated exchange equalization on gold produced.....		95,294,739		86,311,607
Grand Total Value, including exchange.....		205,789,392		186,390,281

NOTE.—The estimated average price of a troy ounce of fine gold in Canadian funds was \$38.50 in both 1941 and 1942.

*Includes relatively small amounts of gold contained in slag, and ore shipped.

(a) Includes production in Larder Lake area.

(b) Includes a relatively small amount of placer gold.

Table 32.—Production of Gold in Canada, and Dividends Paid, by Principal Mines, 1942

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	Dividend 1942	Total dividends to date	See footnotes
	Tons	Tons	Tons	Fine oz.	Tons	\$	\$	
NOVA SCOTIA								
Avon Gold Mines Ltd.	8,530		8,530	3,015	100			(a)
Consolidated Mining & Smelting Co. of Canada, Ltd. (Holman)	10,355		10,355	6,304	40			(a) (b)
Goldbrook Limited	10,000	(c)	(c)	286	(c)	(c)	(c)	(a) (b)
Guysborough Mines Ltd.				103				(d)
Queens Mines Limited	5,699		5,699	1,535	35			(a)
Other gold mines				1,656	(c)	(c)	(c)	
Total Nova Scotia				12,989				(e)
QUEBEC								
Artfield Gold Mines Ltd.	23,809		23,809	2,509	350			(b) (c)
Beattie Gold Mines Ltd.	657,619		657,619	64,669	1,300	650,000	3,994,890	(d)
Bellevue Quebec Mines Ltd.	116,347		116,377	41,684	200			(c)
Canadian Malartic Gold Mines Ltd.	358,732		358,732	37,167	1,000	232,108	1,714,912	(c)
Central Cadillac Mines Ltd.	73,132	11,817	61,315	9,258	200			(c)
Cournoir Mining Co. Ltd.	45,000		30,000	6,959	200			(e)
East Malartic Mines Ltd.	448,691		440,016	69,971	1,500	200,000	2,200,000	(f)
Francœur Gold Mines Ltd.	69,477		69,477	10,996	250			(c)
Lapa Cadillac Gold Mines Ltd.	376,561		376,551	112,416	1,000	1,534,076	6,836,906	(c)
Malartic Gold Fields Ltd.	72,480		72,553	12,195	300			(c)
McWaters Gold Mines Ltd.	258,171	9,364	248,807	50,391	750			(c)
Mic-Mac Mines Ltd.	43,958	892	43,066	8,432	150			(c)
O'Brien Gold Mines Ltd.	75,544		74,266	9,240	600			(c)
Pandora Limited	69,406		69,406	27,362	250			(c)
Perron Gold Mines Ltd.	32,297		32,297	5,306	150	97,500	1,235,000	(a) (g)
Pershing Manitou Gold Mines Ltd.	208,175	65,853	141,638	45,882	360	340,000	1,740,000	(c) (h)
Powell Rouyn Gold Mines Ltd.	(i)		25	11	10			(a) (j)
Senator Rouyn Limited	307,062		301,194	34,201	450	25,000	212,500	(c) (k)
	107,157		107,351	23,597	300			

FOOTNOTES—

(*) Mines which were active in 1942.

(a) Amalgamation.

(b) In addition, 36.2 tons of concentrates stored assaying 2.2 oz. gold per ton.

(c) Data not available.

(d) Clean-up operations only; closed down January 11.

(e) Receipts at Mint, Ottawa.

Sigma Mines (Quebec) Limited.....	403,467	45,319	79,179	1,100	600,000	1,380,000	(e)
Siscoe Gold Mines Ltd.....	394,516		47,671	1,000	301,604	7,745,597	(a) (c)
Staden Malartic Mines Ltd.....	235,181		25,638				(c)
Stadacona Rouyn Mines Ltd.....	131,481		25,461	500			(c)
Sullivan Consolidated Mines Ltd.....	230,601	31,801	43,368	500	360,000	1,720,000	(e)
West Malartic Mines Ltd.....	55,055		6,935	300			(c)
West Cadillac Mines Ltd.....	28,892	1,868	27,025	250			(e) (f)
Val d'Or (Provincial Mine School).....	1,413		554	10			(a) (c)
Copper-gold-silver and other ores.....			282,999		(m)		
Total—Quebec.....			1,092,388				

FOOTNOTES—

- (a) Amalgamation.
 (b) Closed down April 27.
 (c) Cyanide.
 (d) Also shipped arsenic.
 (e) Also shipped tungsten concentrates.
 (f) Closed down July 31.
 (g) Copper-gold concentrates shipped to smelter.
 (h) Closed down August 31.
 (i) Data not available.
 (j) Closed down in May.
 (k) Includes 263,763 tons crude ore shipped to smelter; milling ceased at mine March 31.
 (l) Closed down June 30.
 (m) See Table 60.

ONTARIO

Porcupine District—	173,369		173,369	300	320,000	640,000	(e)
Amor Gold Mines Ltd.....	44,884	4,566	40,318				(d) (c)
Bonetal Gold Mines Ltd.....	139,144	21,443	26,948	350	161,640	565,941	(c)
Brunell Porcupine Mines Ltd.....	360,403	1,984	63,431	1,300		2,552,505	(c)
Buffalo Ankerite Gold Mines Ltd.....	162,390		43,144		500,626	2,135,960	(c)
Coniourup Mines Ltd.....	172,731		31,676	520	178,726	536,178	(c)
Delnite Mines Ltd.....	38,910		6,651	150			(c) (b)
De Sautis Porcupine Mines Ltd.....	556,700		170,547	1,700	3,309,336	52,507,203	(a) (c)
Dome Mines Ltd.....	12,889		3,370	200			(f)
Faymar Porcupine Gold Mines Ltd.....	128,973		59,370		800,000	4,400,000	(c)
Hallnor Mines Ltd.....	1,534,602		370,611	5,700	3,198,000	113,088,400	(e)
Hollinger Cons. Gold Mines Ltd. (Timmins).....	101,829		20,785	300			(c)
Hollinger Cons. Gold Mines Ltd. (Ross).....	207,257	19,677	19,890	600			(c)
Hoyle Gold Mines Ltd.....	798,290		224,031	2,500	2,657,340	29,817,728	(e)
McIntyre Porcupine Mines Ltd.....	798,163		24,813	175	203,509	1,195,614	(c)
Monetta Porcupine Mines Ltd.....	57,103		2,173				(f)
Nakhodas Mining Co. Ltd.....	57,278		16,278	200		190,812	(c)
Naybob Gold Mines Ltd.....	58,908		58,870		400,000	2,800,000	(c)
Pamour Porcupine Mines Ltd.....	524,633		60,825	1,500		86,291	(c)
Paymaster Cons. Mines Ltd.....	202,300		44,169	1,000	600,000	2,250,000	(a) (c) (e)
Preston East Dome Mines Ltd.....	322,467	15,780	72,443				

Table 32.—Production of Gold in Canada, and Dividends Paid, by Principal Mines, 1942—Continued

Property and Province	Ore raised		Material sorted (discarded)		Ore treated		Gold production		Mill capacity 24 hours		Dividend 1942		Total dividends to end of 1942		See footnotes
	Tons	Tons	Tons	Tons	Tons	Tons	Fine oz.	Tons	Tons	\$	\$	\$	\$		
Kirkland Lake District—†															
Bidgood Kirkland Gold Mines Ltd.	48,157				47,900		13,088	125							(c)
Golden Gate Mining Co. Ltd.	8,324				8,324		1,811	400							(a)
Kirkland Lake Gold Mining Co. Ltd.	100,854				100,854		37,846	2,300							(c)
Lake Shore Mines Ltd.	347,951				347,951		144,101	2,300			319,602		3,720,807		(c)
Macassa Mines Ltd.	120,400				120,400		55,582	400			1,600,000		89,220,000		(c)
Sylvestra Gold Mines Ltd.	175,222				175,745		52,418	600			803,420		5,683,394		(c)
Teck-Hughes Gold Mines Ltd.	93,335				93,335		32,427	600			383,910	(2)	37,565,840	(2)	(c)
Toburn Gold Mines Ltd.	43,635				43,635		18,915	175			1,442,143		7,654,937		(c)
Upper Canada Mines Ltd.	86,523			4,075	86,523		35,127	225			240,500		2,109,000		(c)
Wright-Hargreaves Mines Ltd.	283,580				283,580		146,950	1,200			311,116		903,718		(c)
											2,475,000		38,102,500		(c)
Larder Lake District—															
The Chesterville Larder Lake Gold Mining Co. Ltd.	241,815				241,815		29,988	700			43,389		390,501		(c)
Kerr-Addison Gold Mines Ltd.	756,578				756,483		161,811	2,000			1,655,605		4,020,756		(c)
Omega Gold Mines Ltd.	149,274				149,274		20,903	500							(c)
Yama Gold Mines Ltd.	20,817		2,734		18,667		2,049	65							(c)
Matatchewan District—															
Hollinger Cons. Gold Mines Ltd. (Young-Davidson)	296,728				296,942		33,875	1,050			63,364		190,083		(c)
Matatchewan Consolidated Mines Ltd.	315,040				315,040		25,210	1,000					68,600		(c)
Sudbury District—															
Jerome Gold Mines Ltd.	168,628				168,628		29,481	500							(c)
Tyrantite Mines Ltd.	31,383				31,383		3,934	200							(c) (i)
Algoma District—															
Cline Lake Gold Mines Ltd.	45,496				46,119		7,378	250					64,200		(c) (j)
Regency Metals.	6,006				6,006		1,394	35							(a) (k)
Thunder Bay District—															
Bankfield Cons. Mines Ltd.	28,045				27,632		2,839	130							(a) (c) (l)
Hard Rock Gold Mines Ltd.	191,998		57,876		134,122		32,174	450			179,404		837,221		(a) (c) (l)
Leitch Gold Mines Ltd.	39,222		9,146		30,076		25,306	75			228,000		969,002		(a) (e)
Little Long Lac Gold Mines Ltd.	129,601		13,811		115,790		39,345	300			322,175		3,627,175		(a) (c)
McLeod-Cockshutt Gold Mines Ltd.	378,291		145,080		233,036		68,017	650			286,149		1,137,886		(a) (c)
Magnet Cons. Mines Ltd.	51,052		439		50,613		22,448	175			90,000		765,000		(a) (c)
Northern Empire Mines Co. Ltd. (Sand River mine)	23,725		7,130		16,595		4,382	75							(a) (e)
Sturgeon River Gold Mines Ltd.	31,327		14,365		17,757		12,335	75			54,995		219,981		(a) (e) (h)
Tombill Gold Mines Ltd.—Tombill mine.	33,248				33,248		11,141 (*)	125			152,000		454,000		(a) (e) (o)
Elmos mine.	4,942		995		3,947		1,017	30							(a) (p)
Kenora and Rainy River District—															
Kenwest Gold Mines Ltd.	6,324				6,324		489	125							(c)
J. D. Shannon (Goldwood)	37,701				5,000 (q)		254	75							(a) (k) (r)
Wendigo Gold Mines Ltd.			7,576		30,125		10,974	80			2,483		157,450		(a) (s)

ONTARIO—Concluded									
Patricia District—	86,850	10,144	86,850	30,005	225	240,000	300,000	(k) (t)	
Bereas River Mines Ltd.	70,384		60,240		280	260,540	531,598	(a) (c) (k)	
Cochonour Williams Gold Mines Ltd.	138,790		138,790		400	375,000	3,150,000	(a) (c) (v)	
Central Patricia Mines Ltd.	956							(c)	
Gold Frontier Mines Ltd.	165,539	34,054	133,885	23,060	350			(c)	
Hasaga Gold Mines Ltd.		7,414	32,992	13,972	405		119,960	(a) (c)	
Jason Mines Ltd.	40,406	7,724	32,992	38,193	75	209,972	523,729	(c) (k)	
Madson Red Lake Gold Mines Ltd.	146,950		146,226					(c) (e)	
McMarnac Red Lake Gold Mines Ltd.	32,589		32,589					(c) (e)	
McKenzie Red Lake Gold Mines Ltd.	103,861	13,314	85,547	26,321	250	352,200	2,273,550	(a) (c)	
Pickle Crow Gold Mines Ltd.	126,997	18,851	107,951	51,288	400	900,000	7,350,000	(a) (c)	
Sachigo River Exploration Co. Ltd.			(w)				(4)	(a) (c)	
Uchi Gold Mines Ltd.	165,498	2,871	162,627	22,978	750	(3)	(3)	(a) (c)	
Nickel-copper ores (including lead, cobalt, and miscellaneous gold ores)				73,256					
Total Ontario.....				2,763,819					

FOOTNOTES—

- (a) Amalgamation.
 (b) Closed down September 12.
 (c) Cyanidation.
 (d) Milled by Broulan Porcupine Mines Ltd.
 (e) Also shipped tungsten concentrates.
 (f) Subject to revision; closed down May 31.
 (g) Closed down April 30.
 (h) Includes 1,902 ounces recovered from tailings.
 (i) Closed down August 14.
 (j) Closed down October 14.
 (k) Concentrates smelted.
 (l) Closed down August 31.
 (m) Closed down August 26.
 (n) Closed down October 25.
- (o) Closed down November 30.
 (p) Closed down November 29.
 (q) Tailings.
 (r) Closed down May 1.
 (s) Copper-gold concentrates exported.
 (t) Also produces lead; does not include metal content concentrates in stock pile.
 (u) Closed down October 15.
 (v) No milling; closed down August 20.
 (w) Final clean-up only.
 (x) Miners strike in camp early part of year.
 (y) Subject to revision.
 (z) Paid in U.S. funds to end of 1940; 1941 and 1942 includes some Canadian dollars; also 1942 includes \$38,985 paid in 1943.
 (3) Data not complete.
 (4) Assets distributed approximated \$4.56 per share and profits at 90 cents per share.

MANITOBA									
God's Lake Gold Mines Ltd.	72,850		72,850	16,353	200		262,500	(a) (c)	
Gunnar Gold Mines Ltd.	13,472		12,554	5,989	150		647,491	(e) (b)	
Opama-Rockland Gold Mines Ltd.	(d)	918 (*)	(d)	3,755				(a) (c)	
San Antonio Gold Mines Ltd.	199,203	(d)	199,203	58,869	550	478,603	3,311,190	(a) (c)	
Copper-gold and miscellaneous gold ores				51,250		(e)		(e)	
Total—Manitoba.....				136,226					

FOOTNOTES—

- (*) Subject to revision.
 (a) Amalgamation.
 (b) Closed down May 8.
 (c) Cyanidation.
 (d) Closed down July 31; data not recorded; milled by Gunnar Gold Mines Ltd.
 (e) Data not complete; see table number 60.

Table 32.—Production of Gold in Canada, and Dividends Paid, by Principal Mines, 1942—Concluded

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	Dividend 1942	Total dividends to end of 1942	See footnotes
	Tons	Tons	Tons	Fine oz. (a)	Tons	\$	\$	(b)
SASKATCHEWAN								
Cons. Mining & Smelting Co. of Canada, Ltd. (Box)	291,787		291,787	178,862	1,200			(b)
Placer gold							(d)	
Copper-gold and miscellaneous gold ores								
Total—Saskatchewan				178,871				
FOOTNOTES—								
(a) Data not recorded or available for publication; closed down August 15.								
(b) Cyanidation.								
(c) Includes Box mine.								
(d) See table number 60.								
ALBERTA								
Placer gold	(*)	(*)	(*)	34				
FOOTNOTE—								
(*) No record.								
BRITISH COLUMBIA								
Bayonne Cons. Mines Ltd.	11,976	452	11,524	4,599	50	25,000	25,000	(e) (b)
Buena Vista Mining Co. Ltd.	62,755		62,755	3,324	500	(1)	(1)	(e) (d)
Buccanier Mines Ltd.	3,001	(e)						(f)
Bratmore Mines Ltd.	171,095		171,095	90,817	500	1,466,400	9,965,750	(a) (g) (h)
Central Zeballos Gold Mines Ltd.	(e)		(e)	4,610	45			(a) (i) (h)
Cariboo Gold Quartz Mining Co. Ltd.	94,162		93,885	38,016	350	173,330	1,626,636	(a) (h)
A. Endersby (Reno mine)	1,128		883					(h)
Gold Belt Mining Co. Ltd.	(e)		55,299	19,619	150	102,000	255,000	(e) (h) (k)
Hedley Mascot Gold Mines Ltd.	(e)		66,088	22,477	175	181,130	1,154,705	(e) (h) (l)
Homeward Mines Ltd.	(e)		373	594	50			(e) (h) (l)
Island Mountain Mines Co. Ltd.	47,916		47,916	21,097	150	136,563	903,605	(e) (h) (l)
Kootenay Belle Gold Mines Ltd.	26,016		8,310		150			(e) (h) (l)
Kelowna Exploration Co. Ltd.	99,485		99,219	32,425	275	240,000	1,110,000	(e) (h) (l)
Livingstone Mining Co. Ltd.	1,138		874		30			(l)
Muskeeter Mines Ltd.	7,084	2,014	5,070	1,846	25			(l)
Mount Zeballos Gold Mines Ltd.	8,464	2,776	5,686	2,665	60			(l)
R. O. O'Connell (Arlington)	561		776					(l)
Privateer Mine Ltd.	48,280	23,207	25,073	22,360	90	18,305	165,000	(a) (h) (m)
Pioneer Gold Mines Ltd.	89,717	10,093	79,624	40,563	300	319,030	58,203	(a) (h) (n)
Polaris Taku Mining Co. Ltd.	30,966		31,336	17,506	300	402,902	1,784,330	(a) (c) (h)
Sheep Creek Gold Mines Ltd.	55,395		55,395	23,493	150	375,000	6,903,942	(a) (h) (p)
Surf Inlet Cons. Gold Mines Ltd.	27,744	1,628	26,116	8,683	100			(c)
Silbak Premier Mines Ltd.	140,567		140,567	36,300	500	26,720	1,875,000	(a) (h) (q)
Spad Valley Mines Ltd.	20,060	23,531	20,060	6,020	100	400,000	120,278	(a) (h) (r)
Vancouver Island Drilling & Exploration Co. Ltd.	1,119		20,060					(a) (h) (s)
Velvet Gold Leasers (Velvet)	7,880	285	7,595	1,205	100		1,800,000	(a) (h) (t)

[illegible]

FOOTNOTES—

NOTES
[x] Subject to revision.

- (x) Smelted.
- (y) Amalgamation.
- (z) Closed down August 31.
- (1) Closed down August 31.
- (2) Cyanidation.
- (3) Closed down April 5.
- (4) Closed down April 5.
- (5) Not available for publication.
- (6) Closed down August 11.
- (7) Also shipped tungsten concentrates.
- (8) Concentrates smelted.
- (9) Closed down July 7.
- (10) Closed down July 7.
- (11) Closed down February 7.
- (12) Also produced arsenic.
- (13) Also smelted.
- (14) Ore smelted.
- (15) Closed down July 23.
- (16) Closed down July 23.
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YUKON						
Placers.....			11,848,333	(a)	83,198	970,291
Silver-lead ores.....					48	(d)
Total—Yukon.....					83,246	

FootNOTES—

- NOTES
(a) Cubic yards—estimated.
(b) In ores exported.
(c) Not available.
(d) Not available.
(e) Yukon Consolidated Gold Corp. Ltd. only.

NORTHWEST TERRITORIES							
Cons. Mining & Smelting Co. of Canada, Ltd.—Con mine.....	68,380		68,380	(x)	350	(x)	(a) (c)
Ruth mine.....	187		187	(x)	25	(x)	(a) (b)
Goodrook Gold Mines Ltd.....	(x) 7,368	(x)	(x)				(d)
International Tungsten Mines Ltd.....	(x) 7,368		7,368		50		(a) (b) (d)
Negus Mines Ltd.....	25,458		25,458		100		(a) (c)
Piarnigan Mines Ltd.....	31,333		31,333		60		(a) (c)
Rycon Mines Ltd.....	3,824		3,824		125	(x)	(f)
Thompson Lundmark Gold Mines Ltd.....	35,841		37,755	(x)			(a) (c)
Others.....	(x)		(x)				
Total—Northwest Territories.....					75,802 (g)	(x)	
					99,394		
Total—Canada.....					4,841,306		

FOOTNOTES—

- NOTES—
- (x) Not recorded or available for publication.
- (a) Amalgamation.
- (b) Operations ceased August 9.
- (c) Cyanidation.
- (d) Also produced tungsten concentrates.
- (e) Closed down August 31.
- (f) Ore milled at Con mine.
- (g) Includes output of all mines marked (x) under production.

Table 33.—Source of Canadian Gold Production, 1932-1942

Year	In alluvial gold	In crude gold bullion produced at mines (a)	In base bullion produced at lead smelters	In blister copper produced (b)	In ores, matte, slag, etc., exported	Total gold produced
	%	%	%	%	%	Fine oz.
1932.....	1.8	79.3	1.0	15.1	2.8	3,044,387
1933.....	2.0	79.8	0.7	14.2	3.3	2,949,309
1934.....	2.0	78.7	1.1	13.4	4.8	2,972,074
1935.....	1.8	78.3	2.2	13.2	3.9	3,284,890
1936.....	2.2	77.4	1.6	13.8	5.0	3,748,028
1937.....	2.2	80.2	0.9	11.7	5.0	4,096,213
1938.....	2.5	80.8	0.9	11.2	4.5	4,725,117
1939.....	2.5	82.1	0.6	10.4	4.4	5,094,379
1940.....	2.1	82.7	0.6	10.0	4.6	5,311,145
1941.....	2.0	82.6	0.4	10.3	4.7	5,345,179
1942.....	2.3	80.8	0.2	12.1	4.6	4,841,306

(a) Includes a relatively small quantity of gold contained in interprovincial shipments of gold ores, slag, etc., to Canadian smelters.

(b) Some blister copper is refined in the United States; also contains a relatively small quantity of gold recovered from auriferous quartz ores.

34.—Comparative Figures of Gold Production for the World Since the Discovery of America, also Production for Russia, Transvaal, United States and Canada

Year	Russia (a)	Transvaal since the commence- ment of Fields (i)	United States (f) (a)	Canada since the recording of production in 1858	(a) World since the discovery of America
	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.
1493-1600					24,266,820
1601-1700					29,330,445
1701-1800					61,088,215
1801-1840					20,488,552
1841-1850					17,605,018
1851-1860			(c) 1,187,170		64,482,933
1861-1870				220,039	61,098,343
1871-1880			(d) 58,279,778	1,477,999	55,670,818
1881-1890			(e) 15,281,264	904,093	51,280,184
1891-1895		1,070,651	15,808,339	584,102	39,412,823
1896-1900		6,870,158	9,106,834	291,564	62,234,698
1901-1905		12,578,869	15,728,572	3,469,791	78,033,650
1906		13,632,908	19,393,722	4,592,261	19,471,080
1907		5,792,823		556,415	19,977,280
1908		6,450,740		405,517	21,422,244
1909		7,056,266	22,993,218	476,112	21,965,111
1910		7,295,108		453,865	22,022,180
1911		7,527,108		493,707	22,397,136
1912		8,249,461	4,687,053	473,159	22,607,068
1913	(g)	9,107,512	4,520,719	611,885	22,556,347
1914	1,583,677	8,798,336	4,299,784	802,973	21,657,883
1915	1,733,914	8,394,322	4,572,976	773,178	22,846,608
1916	1,382,450	9,093,902	4,887,604	918,056	22,032,542
1917	1,089,885	9,296,618	4,479,057	930,492	20,346,043
1918	871,265	9,018,084	4,051,440	738,831	18,588,127
1919	554,588	8,418,292	3,320,784	699,681	17,339,679
1920	773,610	8,331,294	2,918,628	766,764	16,146,830
1921	73,945	8,158,226	2,476,166	765,007	15,997,692
1922	65,907	8,128,681	2,422,006	926,329	15,496,859
1923	191,614	7,009,767	2,363,075	1,263,364	17,845,349
1924	305,425	9,148,771	2,502,632	1,233,341	18,619,481
1925	546,550	9,574,918	2,628,900	1,525,382	18,673,178
1926	632,390	9,597,573	2,411,987	1,735,735	19,117,568
1927	760,605	9,954,762	2,335,042	1,754,228	19,058,736
1928	688,492	10,122,459	2,197,125	1,852,785	18,885,849
1929	385,800	10,354,157	2,233,251	1,890,592	19,207,452
1930	707,300	10,412,326	2,208,386	1,928,308	20,903,736
1931	1,501,063	10,716,349	2,285,603	2,102,068	22,284,200
1932	1,655,725	10,877,708	2,395,878	2,693,892	24,098,676
1933	1,938,000	11,557,858	2,449,032	3,044,387	25,400,295
1934	2,700,000	11,012,340	2,556,246	2,949,309	27,372,374
1935	3,858,000	10,479,194	3,091,183	2,972,074	29,999,245
1936	4,784,030	10,773,041	3,609,283	3,284,890	32,930,554
1937	(h) 6,500,000	11,335,092	4,357,394	3,748,028	35,118,298
1938	(h) 5,900,000	11,734,553	4,804,540	4,096,213	37,703,334
1939	(h) 5,800,000	12,161,375	5,089,811	4,725,117	39,534,430
1940	(h) 5,000,000	12,821,061	5,611,171	5,094,379	41,067,101
1941	(b)	14,037,741	(j) 6,003,105	5,311,145	(k) 40,332,204
1942	(b)	14,386,361	(l) 5,976,419	5,345,179	(m) 36,000,000
	(b)	14,120,617	(n) 3,618,543	4,841,306	
Total		395,457,382	271,043,720	85,723,542	1,452,008,138

(a) Supplied by United States Mint.

(b) Not available.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1880.

(f) Including Philippine Islands production received in United States. Data represent receipts at United States Mint's refineries assay offices.

(g) Data not available for preceding years. A revision by the United States Mint of estimated Russian gold production for the years 1913 to 1934 was made from United States consular reports, based principally on Soviet publications. While available data are quite indefinite and, in many instances, contradictory, it is believed that this revision more nearly represents actual production than data heretofore used. Figures for Russian production since 1937 supplied by American Bureau of Metal Statistics.

(h) Subject to revision. American Bureau of Metal Statistics.

(i) Annual Report—Department of Mines, Union of South Africa. 1941 and 1942 figures, Transvaal Chamber of Mines.

(j) Includes 1,140,126 fine ounces received from Philippines.

(k) Includes conjectural data for Russia.

(l) Includes 1,144,332 fine ounces from Philippine Islands.

(m) The Mining Journal, London—subject to revision.

(n) United States Bureau of Mines—preliminary; includes 140,330 ounces from Philippine Islands.

Table 35.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1931-1942

Month	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940-1942
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
January.....	20.71	24.24	23.64	33.05	34.95	35.06	35.01	34.99	35.30	38.50
February.....	20.67	23.67	24.74	35.29	35.05	35.18	35.01	35.00	35.19	38.50
March.....	20.67	23.11	24.78	35.08	35.40	35.11	34.98	35.05	35.13	38.50
April.....	20.68	22.98	25.33	34.93	35.18	35.13	34.95	35.15	35.15	38.50
May.....	20.68	23.38	27.75	34.94	34.95	35.00	34.94	35.22	35.13	38.50
June.....	20.73	23.83	28.24	34.73	35.05	35.09	35.02	35.36	35.07	38.50
July.....	20.74	23.73	30.58	34.59	35.08	34.91	35.05	35.24	35.06	38.50
August.....	20.73	23.61	30.09	34.19	35.09	35.00	35.00	35.12	35.01	38.50
September.....	21.55	22.88	31.79	34.18	35.28	34.99	35.00	35.12	37.21	38.50
October.....	23.22	22.65	31.48	34.27	35.49	34.99	34.99	35.32	38.43	38.50
November.....	23.22	23.73	32.68	34.16	35.37	34.95	34.98	35.25	38.50	38.50
December.....	25.01	23.85	32.14	34.57	35.33	34.98	34.93	35.28	38.50	38.50
Yearly average.....	21.55	23.47	28.60	34.50	35.19	35.03	34.99	35.17	36.14	38.50

NOTE.—Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is noted elsewhere in this report. At December 31, 1942, the price paid by the United States Treasury for gold purchased by the Mint continued at \$35 per troy ounce of fine gold, less $\frac{1}{4}$ of 1 per cent. Actual payment by the United States Treasury for gold in imported and domestic ore or concentrate was at 99.75 per cent of the price quoted by the Treasury, which, at the close of 1942, was equal to \$34.9125 per ounce.

Table 36.—Precious Metals Consumed by the Jewellery and Silverware Industry in Canada, 1942 and 1941

Materials	Cost at works	
	1942	1941
	\$	\$
Precious metals—		
Fine gold.....		2,343,880
Gold alloys.....		392,067
Fine silver.....		1,144,409
Silver alloys.....		646,528
Platinum.....		208,318
Old gold, jewellers' findings, waste and scrap for refining.....		1,308,882
Gold-filled wire and stock.....		510,646
Precious and semi-precious stones.....		732,748

GOLD EXPORTS

(Order in Council P.C. 11498—December 22, 1942)

WHEREAS by Order in Council, P.C. 1150, dated May 17, 1932, regulations respecting the export of gold, whether in the form of coin or bullion, from the Dominion of Canada, were made under the authority of The Gold Export Act;

AND WHEREAS the said regulations were by Order in Council, P.C. 9131, dated November 26, 1941, continued in force until December 31, 1942;

AND WHEREAS in the opinion of the Minister of Finance it is expedient that the said regulations be continued in force beyond December 31, 1942;

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of the said "The Gold Export Act," in pleased to order that the provisions of the said Regulations be and they are hereby continued in force and effect until December 31, 1943, unless sooner rescinded by Order in Council.

NOTE.—Order in Council P.C. 1150, reads, in part, as follows:—"The export of gold, whether in the form of coin or bullion (including ore, etc.), from the Dominion of Canada, is hereby prohibited, except in such cases as may be deemed advisable by the Minister of Finance, and under licence to be issued by him.....".

GOLD IN CANADIAN EXPORT TRADE

Exports of gold in Canadian trade statistics were distinguished in previous reports as between monetary and non-monetary. Monetary gold exports were described as those which entailed a reduction in the Dominion's monetary gold stocks. All other gold exported (classed as non-monetary) were shown as merchandise, and included with the total merchandise exports.

The fact that gold is a money metal gives it peculiar attributes which distinguish it from other commodities in trade. In particular, the movement of gold in international trade is determined almost exclusively by monetary factors. The amount of exports may fluctuate widely from month to month owing to other than ordinary trade or commercial considerations. In addition, gold is generally acceptable. It does not have to surmount tariff barriers and is normally assured a market at a relatively fixed price. For these reasons provision was made in previous trade reports for a supplementary table showing exports from Canada excluding all gold.

It is further to be noted gold does not move in international trade in any direct or normal relation to sales and purchases. It may be bought or sold abroad without moving in or out across the frontier, the sales or purchases in such cases being recognized by simply setting aside or "earmarking" the gold in the vaults of the central bank. Trade statistics deal only with physical movements, sales or purchases of gold which do not involve an actual movement being more properly regarded as an "invisible item" and taken care of in the "International Balance of Payments" statements. Changes in the Bank of Canada's stock of gold under earmark do not enter, therefore, into the trade statistics.

The publication of statistics showing the gross imports and exports of gold has been temporarily suspended as from September, 1939. Statistics for periods prior to this time have been accordingly revised to exclude all gold formerly included in the total of merchandise exports.

Statistics showing the NET exports of non-monetary gold, including changes in stocks held under earmark, were published as a supplement to the trade figures until February, 1942 when their publication was discontinued by regulation.

Data relating to Canadian gold stocks since 1939 were not published. For information pertaining to these stocks prior to 1940, see previous annual gold mining reports as issued by the Bureau of Statistics.

Table 37.—World's Monetary Stocks of Gold at the Close of 1939, 1940 and 1941
(Subject to Revision)

(Compiled by the United States Mint from available data)
(Stated in United States money)

Country	Total Gold Stock Value, 1939 (e)	Per capita	Total Gold Stock Value, 1940 (e)	Per capita	Total Gold Stock Value, 1941 (e)	Per capita
	\$	\$	\$	\$	\$	\$
United States (d).....	17,643,577,000	133.17	21,991,102,000	165.98	22,736,557,000	167.62
Canada.....	206,223,000	18.55	7,251,000	0.63	5,000,000	0.44
Argentina.....	466,000,000	36.51	438,078,000	34.33	389,798,000	29.26
Belgium.....	607,140,000	72.85	736,000,000	88.05	734,000,000	87.42
Denmark.....	53,083,000	14.10	52,003,000	13.82	44,000,000	11.39
France.....	2,708,878,000	64.64	2,000,068,000	47.73	2,000,000,000	47.64
Germany.....	40,118,000	0.59	40,280,000	0.60	29,000,000	0.42
Great Britain.....	10,314,000	0.22	1,991,000	0.04	1,648,000	0.03
Italy.....	144,000,000	3.29	137,000,000	3.13	(a)	(a)
Netherlands.....	690,128,000	79.92	617,299,000	71.49	575,000,000	64.44
Norway.....	93,916,000	32.31	84,388,000	29.03	(a)	(a)
Poland.....	85,000,000	2.46	.....	.....	.....	.....
Portugal.....	68,900,000	9.47	92,284,000	12.69	59,000,000	7.66
Roumania.....	151,606,000	7.72	157,400,000	8.01	182,000,000	13.49
Russia (Soviet Union).....	(a)	(a)	(a)	(a)	(a)	(a)
Spain.....	525,000,000	21.13	(a)	(a)	(a)	(a)
Sweden.....	308,117,000	49.02	304,955,000	48.52	223,371,000	35.06
Switzerland.....	548,580,000	131.43	502,115,000	120.29	665,000,000	156.21
British India.....	274,472,000	0.81	274,480,000	0.81	274,392,000	0.71
Japan (including Chosen, Taiwan, Kwantung).....	163,570,000	1.61	163,570,000	1.61	(a)	(a)
Netherlands East Indies.....	89,930,000	1.40	139,659,000	2.17	235,000,000	3.31
Egypt.....	52,500,000	3.30	52,000,000	3.10	52,000,000	3.10
Australia.....	4,200,000	0.61	16,683,000	2.43	(a)	(a)
New Zealand.....	23,086,000	12.04	23,087,000	14.41	23,000,000	14.08
Union of South Africa.....	250,451,000	2.13	352,713,000	36.00	366,000,000	35.39
Other countries.....	724,292,000	.....	902,251,000	.....	(a)	(a)
Total.....	25,933,081,000	(b)12.71	29,086,657,000	(b)14.28	(c)	(c)

(a) Data omitted because of indefiniteness or unavailability.

(b) Population figures are principally supplied by United States Department of Commerce, 1938-40.

(c) Totals omitted due to the great number of instances in which data are not available.

(d) Includes Alaska, Hawaii and Puerto Rico.

(e) 1 ounce fine gold=\$35.

NOTE.—It is understood that material amounts of gold are not reported by several countries, such as, amounts held in secret funds for stabilizing currencies and those hoarded or held outside of regularly reported stocks.

ORDER IN COUNCIL P.C. 1238—FEBRUARY 15, 1943

WHEREAS subsection one of section twenty-five of the Bank of Canada Act, Chapter forty-three of the Statutes of Canada, 1934, provides that the Bank shall sell gold to any person who makes demand therefor at the head office of the Bank and tenders the purchase price in legal tender, but only in the form of bars containing approximately four hundred ounces of fine gold;

AND WHEREAS by Order in Council P.C. 1397 dated February 23, 1942, passed under the provisions of sub-section two of said section twenty-five of the said Act, the operation of said subsection one of section twenty-five was suspended for a period of one year from and after March 10, 1942.

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of said subsection two of section twenty-five of the Bank of Canada Act is pleased to order that the operation of said subsection one of section twenty-five be and it is hereby suspended for a further period of one year from and after the tenth day of March, 1943, unless sooner rescinded by Order in Council.

ROYAL CANADIAN MINT—OTTAWA 1942

Six thousand three hundred and sixty-two deposits of gold bullion weighing 5,576,488 ounces were received at the Mint from Canadian Mining Companies and sundry persons, and 283 deposits weighing 184,557 ounces received from the Dominion of Canada Assay Office, Vancouver, B.C. The total gross weight of gold deposited, including mutilated gold coin, was 5,761,044 ounces, containing by assay 4,611,982 ounces fine gold and 652,827 ounces fine silver. This shows a decrease as compared with the year 1941 of 756 deposits, gross weight 683,010 ounces, fine gold 480,626 ounces fine and fine silver 94,094 ounces fine.

The average price paid per ounce of fine gold contained in deposits was \$38·47156 and per ounce fine silver 38·8709 cents.

The net amount paid by the Royal Canadian Mint to depositors by cheque was \$169,947,315·48. In addition, 7,294,180 ounces of fine gold with a statutory value of \$150,784·48 were issued to depositors.

Postage collected for the Postmaster General on deposits shipped to the Mint, postage collect, amounted to \$36,840·33.

There were 1,460 rough gold deposits received at Vancouver and 6,362 received at Ottawa. Details as to origin are shown in the following table.

Table 38.—

Source	Gross Weight	Fine Gold	Fine Silver
	Ounces	Ounces	Ounces
From Canadian mines—			
Ontario.....	3,385,021·125	2,729,104·140	359,475·41
Quebec.....	1,479,841·175	1,204,733·578	154,156·67
British Columbia.....	430,910·730	321,977·106	74,885·01
Manitoba.....	156,807·225	125,630·223	12,689·24
Yukon.....	104,345·835	83,198·102	17,321·45
Nova Scotia.....	13,815·825	12,919·840	420·96
Northwest Territories.....	132,074·925	98,947·686	22,414·13
Alberta and Saskatchewan.....	30,564·250	19,438·116	7,793·96
Total from mines.....	5,733,380·590	4,595,948·791	649,156·83
From jewellery and scrap.....	26,845·308	13,294·731	3,255·11
Mutilated gold coin.....	1·745	1·558	.....
Grand Total.....	5,760,227·643	4,609,245·080	652,411·94

A detail of the fine gold issued in the form of trade bars to the Bank of Canada and granulated, sweep, proof plate and medals to sundry persons is shown hereunder:

	Ounces Fine
11,395 Trade Bars to Bank of Canada.....	4,543,250·214
Depositors.....	7,294·180
Sales to Manufacturers.....	53,404·343
Proof Plate.....	13·467
Medals.....	4·067
Sweep.....	7,925·956
	<u>4,611,892·227</u>

This total shows a decrease of 522,455·578 ounces fine as compared with the year 1941.

Dominion of Canada Assay Office, Vancouver, B.C.

The amount disbursed through this office in 1942 for the purchase of gold bullion was \$5,628,080·26, as against \$6,216,906·58 for the calendar year 1941, a decrease of \$588,826·32.

Particulars as to source, weights, etc., are as under:

Table 39.—

Source	Number of Deposits	Gross Weight	Fine Gold	Fine Silver
		Ounces	Ounces	Ounces
Yukon Territory.....	429	104,334·06	83,188·678	17,319·72
British Columbia.....	762	74,343·73	62,018·563	8,389·65
Alberta and Saskatchewan.....	13	54·75	42·464	3·88
Northwest Territories.....	1	4·25	3·538	·47
Jewellery and dental scrap.....	255	5,001·39	2,264·664	708·82
	1,460	183,738·18	147,517·917	26,422·54

THE ALLUVIAL GOLD MINING INDUSTRY IN CANADA

In 1942, and for many years past, the greater part of the Canadian production of alluvial gold came from the Yukon Territory and British Columbia; relatively small quantities are also obtained in Alberta, Saskatchewan, and sometimes Quebec.

It is estimated that 137,296 troy ounces of crude gold were recovered from Canadian alluvial deposits in 1942. Of this production, 10 ounces came from Saskatchewan, 36 ounces from Alberta, 32,904 ounces from British Columbia and 104,346 ounces from Yukon. In addition to crude gold recovered, there were 40 ounces of platinum obtained from deposits in British Columbia; also a relatively small quantity of tungsten concentrates were produced from alluvial operations conducted in Yukon.

Quebec and Ontario.—No placer gold mining operations were reported in 1942 from either Quebec or Ontario.

Saskatchewan and Alberta.—Placer gold has been mined along the North Saskatchewan River at various points between Rocky Mountain House, Alberta, and Prince Albert, Saskatchewan, from about 1860. Most activity has, however, been confined to the Alberta region, particularly in the vicinity of Edmonton.

The returns of gold from the river for a period of thirty-two years, from 1887 to 1918, are given by the Department of Mines as 15,036 fine ounces valued at \$310,814. These figures were compiled by the Department from reports of local bank managers as a basis. In 1887 the first dredge was built on the river and from that time dredges have worked with varying success, though most of the gold has been obtained by miners working with shovel and grizzly collecting the gold on blankets, after which the blankets are washed and the gold separated from the tailings by means of mercury.

The gold is irregularly distributed in the gravels of the river and under bench gravels and is recovered when conditions are convenient to work such bars which move from point to point according to the vagaries of the stream. No individual reports are received from prospectors and production as credited to placer mining is obtained from Government mint statements which show total recoveries of fine gold in 1942 of 9 ounces from Saskatchewan deposits and 34 ounces from Alberta.

The Department of Lands and Mines of Alberta reported that activity along the Athabaska River in townships 63 and 64, range 3, west of the 5th meridian, continued during the fiscal year ending March 31, 1942 and 18 grants were issued for staked claims. Eight other grants were issued, six along the McLeod river, one on the North Saskatchewan River, and one in the Grande Prairie District.

Northwest Territories.—No production of placer gold in the Territories was reported direct by miners in 1942; however, Liard-Nahanni Gold Placers Ltd. carried on prospecting during 1941 in the Flat River area from June to December 26. Relatively small quantities of gold received at the Vancouver Assay Office from the Northwest Territories represent metal obtained from alluvial deposits; particulars relating to these recoveries, totalling 39 fine ounces in 1941, are not available.

British Columbia.—It has been found impractical to obtain complete reports for each individual placer gold mining operation in British Columbia inasmuch as a considerable quantity of the crude placer gold is recovered annually by prospectors of no fixed abode who, in many instances, market their recoveries through local merchants and banks.

Recoveries in 1942 were made chiefly from deposits located in the Atlin, Cariboo, Omineca and Quesnel districts; other districts to report production included Nelson, Stikine, Vernon, Similkameen, Kamloops, Port Steele, Revelstoke, Clinton and New Westminster.

In 1942 official returns were made to the Dominion Bureau of Statistics by approximately 72 operators who reported 155 employees and the distribution of \$275,485 in salaries and wages. Consumption of fuel and process supplies amounted to \$46,366. The value of crude gold pro-

duction was \$1,004,230 compared with \$1,352,648 in 1941. The quantity of sands and gravels, including overburden or barren material, moved during the year under review was estimated at 1,884,887 cubic yards. Equipment employed in mining operations included hydraulic jets (Monitors-Giants), gas shovels, drag lines, tractors, derricks, pumps and dredges. Ground work included bench gravels, river gravels and tailings. Work was conducted both on the surface and underground.

Bulletin No. 15, "Hydraulic Mining Methods"—issued by the British Columbia Department of Mines states: "When placer gold was first discovered in British Columbia much of the gravel was mined by methods other than hydraulicking. Subsequently, however, with the working out of rich shallow gravel, extensive yardages of lower grade gravels were left which, under favourable conditions, were mined by hydraulicking. This type of mining produces the largest proportion of placer gold at present. . . . All the rich ground that is known has been, or is being worked. In the past, failure to sample and properly estimate the available yardage of placer deposits has resulted in a tremendous waste of money and effort. . . . A placer deposit may be sampled by any one or a combination of methods; by panning gravel from natural exposures, by drifting, by test-pitting, by shaft sinking, or by Keystone-drilling. In every instance, in order to get reliable results, the work should be done carefully and systematically so that the information may be compiled to give as complete a picture of the deposit as it is possible or economical to obtain."

Yukon.—The following is from the Annual Report of G. A. Jeckell, Controller of Yukon Territory, for the fiscal year ending March 31, 1943:

"The amount of placer gold mined during the year in the Territory, on which royalty export tax was paid, was 105,430.89 ounces, produced as follows: Dawson district, 102,570.61 ounces; Mayo district, 2,218.00 ounces; and Whitehorse district, 642.28 ounces. The royalty collected was \$39,536.79, as follows: Dawson, \$38,464.06; Mayo, \$831.77; and Whitehorse, \$240.96. The gold production was 17,988.09 ounces greater than for the previous year.

"In the Dawson district one hundred and fourteen new placer location grants, twenty-eight relocation grants, and two thousand, four hundred and sixteen renewal grants were issued, representing two thousand five hundred and fifty-eight claims in good standing. Three dredging leases were renewed covering twenty-three miles, and fees for the renewal of four hydraulic leases were paid.

"In the Mayo district eight new placer location grants and one hundred and twenty-eight renewal grants were issued, making one hundred and thirty-six placer claims in good standing.

"In the Whitehorse district one new location grant and twenty renewal grants were issued, making twenty-one placer claims in good standing. The total number of placer claims in good standing in the Territory was two thousand seven hundred and fifteen.

A review in part of the operations of the Yukon Consolidated Gold Corp. Ltd. follows:

"The winter of 1941-42 was unusually mild. A cold spell of about ten days duration occurred in early December, when the temperature fell to 50 degrees below zero, after which the weather was comparatively moderate until the middle of March, when again temperatures of below 40 degrees were reported. . . . The first half of the summer season was unusually dry but, beginning about July 15, heavy intermittent rains, general in character, occurred and kept the streams at high stages throughout the remainder of the season. The ice in the Yukon River moved out on May 6 with only a slight rise in water. During the dry period, especially in the latter part of May and in June, many forest fires occurred and for a period of almost three weeks the creek valleys were filled with a blanket of smoke. The autumn was mild and excellent dredging conditions prevailed until the first of December. Throughout the entire season the company's operations were seriously affected by an acute labour shortage. . . . It was found necessary to shut down several operations in order to bring other crews approximately up to requirements. In order to enlarge many of the scanty crews, full advantage was taken of all available Indian labour. . . . The company's hydro-electro power plant, which is located on the north fork of the Klondike River, operated continuously during the year and generated

a total of 33,867,400 k.w. Of this amount, 73 per cent or 24,623,400 k.w. were sold to the Dawson Electric Light & Power Company Limited for power and light in the city of Dawson. . . . Stripping of muck overburden was carried on at seven places during the summer. The total amount of muck removed was 2,501,681 cubic yards at a cost of \$174,285 or 6.97 cents per cubic yard. Cold water thawing operations were carried on at seven localities during the 1942 season; a total of 4,529,117 cubic yards were thawed at an expenditure of \$202,648 or a cost of 4.474 cents per cubic yard. The average water temperature was 49.7 degrees and the thawing duty 7.25 cubic yards per M.I.D. of water. . . . Ten dredges were operated during the 1942 season. Two dredges, however, Nos. 6 and 9, were shut down before the end of the normal operating season in order to transfer the men to other dredges where the crews had become too small for proper operation. Spring dredge repairs were started on March 16; dredge No. 5, which is located at Granville, commenced active operation on April 8, however, owing to the backward spring and the lack of sufficient power, the starting dates of the other dredges were drawn out to May 14. Operating conditions were favourable at all dredges throughout the season. The dredging period extended to December 1, when the last dredge was shut down. The total production for the year from dredging operations was 73,530 fine ounces of gold valued at \$2,830,907, with gold at \$38.50 per ounce Canadian and 15,610 fine ounces of silver valued at \$6,295 from 10,401,131 cubic yards or 27.22 cents per cubic yard dredged.

"Other Placer Operations.—Clear Creek Placers Ltd. discontinued their drag line operations on the left fork of Clear Creek and erected a 3 cubic foot pontoon type steel construction dredge. This dredge started digging September 7. The Holbrook Dredging Company, operating under receivership, continued mining operations on the Upper Sixtymile River, commencing operations about March 22 and closing down on November 12. There were the usual summer mining operations by individual claim owners on the older placer creeks in the Klondike and Sixtymile Districts, but no new operations were commenced. In the Mayo district the most important placer operations were those of the Haggart Creek Mining Company on Haggart Creek, Swanson and Lunde on Dublin Gulch and Middlecoff on Hight Creek. The operators on Dublin Gulch, in addition to gold, made a recovery of scheelite concentrate which was shipped to the Mines Branch, Ottawa. A greater effort is being made in 1943 to increase the recovery of scheelite on Dublin Gulch. In the Whitehorse district there was little mining activity during the year, the Alaskan Highway and associated projects proving more attractive. One hundred and eight miles of prospecting leases were issued during the year as against two hundred and thirty-six miles leased in this manner during the previous year.

"Five schools were maintained in Yukon during the year, namely, two at Dawson, and one each at Whitehorse, Carcross and Mayo. The number of pupils enrolled in June, 1942 was two hundred and seventy. The sum of \$1,449 was expended on maintenance and improvements to certain airports in the Territory.

"The total revenue collected in the Dawson office on account of mining lands was \$70,109.54. Of this amount, \$69,428.36 was from placer and \$681.18 from quartz. In the Mayo Mining Recorder's office the total collections on account of mining were \$3,880.61; of this amount, \$1,764 was from placer and \$2,116.61 from quartz. In the Whitehorse Mining Recorder's office the total collections on account of mining were \$1,022.92, of which \$462.97 was from placer. \$124.00 from quartz, \$66 from coal leases and \$369.95 from the sale of maps."

Table 40.—Summary Statistics of Alluvial Gold Mining in Canada, 1941 and 1942

	1941			1942		
	(d) British Columbia	Yukon (e)	(g) (f) Quebec Saskatchewan and Alberta	(d) British Columbia	Yukon (e)	(i) Saskatchewan and Alberta
Number of firms and individual operators (f).....	98	7	3	72	8	
Capital employed.....\$	2,187,519	8,568,187		1,028,679	9,043,238	
Number of employees.....	393	403	1	155	316	
Salaries and wages paid.....\$	625,173	1,328,995	110	275,485	1,007,789	
Electricity generated for own use.K.W.H.	560,670	29,287,200			24,624,400	
Electricity generated for sale.....		3,722,000			4,169,616	
Crude gold recovered—crude.....oz.	43,775	88,488	4	32,904	104,346	46
Platinum recovered.....oz.	60			40		
Value of platinum recovered.....\$	2,293			1,528		
Quantity of material handled (h) cu. yd.	4,587,103	8,792,220		1,884,887	11,875,833	
Tungsten recovered.....				(see under Auriferous quartz)		
Length of ditches.....miles (b)	140	56		56	52	
Total gross value of alluvial products.\$	1,354,941	2,766,951	124	1,005,758	3,314,217	1,655
Fuel and electricity used (purchased).\$	46,439	109,079		26,226	77,098	
Process supplies used.....\$	54,972	13,517		20,140	17,203	
Cost of freight and express on dust, nuggets, bullion, etc., shipped (c).\$	2,947	42,042		2,626	28,741	
Cost of smelter, refinery and mint treatment on material shipped (c).\$	6,510	55,955		4,991	29,610	
Total net value of alluvial products...\$	1,244,073	2,545,458	124	951,775	3,161,565	1,655

(f) In addition to the number shown in the table, there were numerous small operators from whom returns were not obtainable; subject to revision.

(a) Recoveries for Alberta and Saskatchewan represent receipts of crude gold from Alberta and Saskatchewan at the Royal Canadian Mint, Ottawa, and the Dominion Assay Office, Vancouver, B.C. No other statistics available.

(b) Includes length of flume in use.

(c) Information not completely available.

(d) Value of crude gold in Canadian funds in 1941 was estimated to be \$30.95 per crude ounce. In 1942 it was \$30.52.

(e) Value of crude gold in Canadian funds in 1941 was estimated to be \$31.27 per crude ounce. In 1942 it was \$31.76.

(f) Value of crude gold in Canadian funds in 1941 was estimated to be \$31.00 per crude ounce.

(g) Quebec only—data not available for Alberta and Saskatchewan.

(h) Includes some overburden or barren material.

(i) Only production data available in 1942.

Table 41.—Alluvial Gold Recovered and Quantity of Material Handled (†) 1925-1942

Year	BRITISH COLUMBIA				YUKON				Average value gold per fine oz.
	Material handled (x)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	Material handled (x)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	
	cu. yd.	fine oz.	fine oz.	\$	cu. yd.	fine oz.	fine oz.	\$	
1925.....	(a)	13,181	(a)	.....	3,103,892	47,817	0-0154	0-318	20-67
1926.....	1,237,090	16,730	0-0135	0-279	2,501,200	25,344	0-0101	0-208	20-67
1927.....	2,470,552	7,353	0-0029	0-0599	2,421,489	30,778	0-0127	0-262	20-67
1928.....	1,188,667	6,739	0-0057	0-1178	5,097,182	34,116	0-0067	0-1385	20-67
1929.....	1,336,390	5,158	0-0039	0-0806	4,500,000	35,678	0-0079	0-1633	20-67
1930.....	224,339	7,164	0-0319	0-6593	3,559,642	35,160	0-0099	0-2046	20-67
1931.....	1,587,271	13,741	0-0086	0-1853	4,914,638	44,061	0-0090	0-1939	21-55
1932.....	1,053,677	16,320	0-0155	0-3637	6,051,256	40,373	0-0067	0-1572	23-47
1933.....	1,326,721	19,142	0-0144	0-4118	5,605,522	39,174	0-0070	0-2002	28-60
1934.....	2,034,522	20,145	0-0099	0-3415	6,315,070	38,703	0-0061	0-2104	34-50
1935.....	1,855,937	24,744	0-0133	0-4680	5,442,861	35,705	0-0066	0-2322	35-19
1936.....	2,083,934	34,711	0-0166	0-5815	8,067,159	50,192	0-0062	0-2172	35-03
1937.....	3,472,025	43,322	0-0125	0-4373	8,298,514	46,679	0-0056	0-1959	34-99
1938.....	4,138,746	46,207	0-0112	0-3939	8,760,625	71,303	0-0080	0-2818	35-17
1939.....	4,779,407	39,797	0-0083	0-2999	11,152,195	85,572	0-0077	0-2732	36-14
1940.....	6,680,457	32,128	0-0048	0-1848	11,551,170	79,905	0-0069	0-2656	38-50
1941.....	4,587,103	35,020	0-0076	0-2926	8,792,220	70,847	0-0081	0-3119	38-50
1942.....	1,884,887	26,323	0-0139	0-5352	11,875,833 (b)	83,198	0-0070	0-2695	38-50

(†) In addition, relatively small amounts of alluvial gold have been recovered in Quebec, Saskatchewan and Alberta, but complete data are not available; also, data relating to material handled, particularly those pertaining to small operations, are not complete and necessitate estimates in order to obtain totals.

(x) Data partly conjectural and includes some overburden and barren material.

(a) Not available.

(b) Fine gold received at Royal Canadian Mint; previous year's figures represent estimated fine gold in crude gold recovered.

THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA

The great part of the gold of Canada comes from the Canadian shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of MacKenzie River. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller but very considerable proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon Territory—the gold production from this section includes relatively large quantities obtained from alluvial deposits. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

The number of Canadian gold mining firms reporting mining operations in 1942 totalled 223 compared with 338 in 1941 and 428 in 1940. During 1942 there were 227 properties in operation as against 357 in 1941; 184 mines reported production compared with 253 in the preceding year and 33 in 1923. From official returns received it was estimated that 42 Canadian gold mines suspended all operations in 1942. Of these, 4 were located in Quebec, 14 in Ontario, 6 in Manitoba and Saskatchewan, and 13 in British Columbia.

The gross value of output for the entire auriferous quartz mining industry, including the value of all recoverable metals, gold, silver, etc., totalled \$160,564,783 in 1942 compared with \$179,103,182 in 1941. Of the 1942 total, \$104,472,446 represented recoveries from Ontario ores, \$31,413,162 from Quebec ores and \$6,629,819 from the gold mines of British Columbia.

Employees in the lode gold mining industry totalled 26,030 compared with 32,551 in 1941 and 5,524 in 1923. Salaries and wages paid amounted to \$54,388,872 as against \$62,150,810 in 1941, and fuel and purchased electricity consumed by the industry in 1942 totalled \$7,615,766. The cost of explosives, drill steel and other process supplies used in 1942 amounted to \$17,922,522.

Dividends paid during 1942, as computed from actual returns made by the auriferous quartz mining industry, totalled \$34,571,376 compared with \$46,563,187 in 1941.

NOVA SCOTIA GOLD MINING INDUSTRY, 1942

(J. P. Messervey, Inspector of Metal Mines, Nova Scotia Department of Mines)

The gold operations in the province produced 12,989 fine ounces of gold in 1942 as compared with 19,170 fine ounces in 1941.

The number of operators was reduced to three companies to carry on steady mining and milling operations. The needs of industry for other minerals caused a scarcity of experienced labour in this field, and it became increasingly difficult to obtain equipment and supplies for gold mining.

The work carried on during the year was by:

Consolidated Mining and Smelting Company of Canada Limited, Caribou, Halifax County, who in addition to the regular production deepened the Holman vertical shaft from the 500 to the 800 foot level and started a drift from the 800 foot station southeast to the ore zone.

Avon Gold Mines Limited, Oldham, N.S., carried on work steadily in the Dunbrack mine with success. A considerable footage of new development work was carried out during the first six months of the year but the number of available employees had dwindled to 50 per cent by the end of the year so that it became apparent that they would have to cease operations early in 1943 for the duration of the war.

Queens Mines Limited continued operations at Molega, Queens County, both with underground development and installation of a 25 ton ball mill plant.

The minimum work requirements on leases specified by the Mines Act have been waived for the duration of the war.

THE GOLD MINING INDUSTRY IN QUEBEC IN 1942

(A. O. Dufresne, Deputy Minister, Quebec Department of Mines)

During the twelve months of 1942, the gold output (shipments) of Quebec mines reached a new high record of 1,090,659 ounces, valued at \$41,990,372. While the output was slightly in excess of the figures for the previous year of 1941, it must be admitted that the peak of production was reached in the first half of the year, and there was a very noticeable falling off in the gold output during the last six months of 1942. The scarcity of labour was largely responsible for these conditions, and it seems unlikely that there will be any improvement, insofar as the gold mining industry is concerned, until the war has been brought to a successful conclusion.

Practically all of the gold produced in the province of Quebec comes from the counties of Abitibi and Temiscamingue. Returns of production were received from 33 mining companies, and from several individual shippers of small quantities. The year 1942 saw three new mines come into production in western Quebec, namely, West Malartic, Mic Mac and Golden Manitou, the latter being essentially a zinc mine, where the gold occurs in association with the base metal ore. The Tetrault lead-zinc mine, in Montauban township, was re-opened during the year, and a small output of gold resulted from this operation.

For general statistical purposes, the gold mines of western Quebec have been classified into two groups, namely, the "straight gold" producers, where the gold occurs in association with other precious metals in a quartz or quartzose gangue, and the "sulphide" mines, where the gold is considered essentially as a by-product in the mining of complex sulphide ores of such metals as copper, zinc, and lead, and the mineral iron pyrites.

In 1942 approximately 75 per cent of the gold production of the province was derived from the "straight gold" ores, and the remaining 25 per cent was recovered from the treatment of base metal ores.

Prospecting activities were at a low ebb in 1942, the number of recorded claims amounting to only 4,367. In the peak year of 1937, 18,641 mining claims were recorded in the province.

In spite of the difficulties imposed by the war, the "straight gold" mines, as a whole, had a very good year. Tonnage was reduced at several properties, and the Arntfield, Cournor, Pandora and Wood Cadillac mines were obliged to suspend operations, but the loss in gold output resulting from these factors was more than balanced by the production from the new mines, and by improvements in the grade of the ore at a number of older mines.

In the western part of the Abitibi-Temiscamingue region, the Francoeur mine was in continuous operation, with tonnage only slightly below the figures for the previous year. Production was continued at the Arntfield until April, 1942, when financial difficulties forced suspension of all operations. Tonnage and gold output were slightly reduced at the McWatters mine. At Senator Rouyn, both tonnage and grade improved, and the main shaft was deepened from the 875-foot level to the 1,430-foot horizon where four new levels were established. The Powell-Rouyn mill was shut down in April, 1942, and since that time all the mine output has been shipped by truck to the Noranda smelter where it is used as a siliceous flux; tonnage and gold output decreased somewhat below the figures for the previous year. At the Stadacona Rouyn mine, production was maintained at a very satisfactory level, and the main shaft was deepened to 2,325 feet from the surface. The Beattie mine and mill also operated continuously with little change in tonnage, but the grade of the ore was appreciably reduced owing to an inrush of clay and quicksand in the north workings. In Guillet township, operations at the Belleterre Quebec mine were continued at a steady rate, and the capacity of the Company's power plant on the Winneway river was doubled by the addition of a second 1,375 K.V.A. generator.

In the Bousquet-Cadillac area, the new Mic Mac mill was turned over in June, and it has demonstrated a capacity of 600 tons per day; due to labour shortage, the daily tonnage treated during the remainder of 1942 averaged only 380 tons. The O'Brien mine operated at a steady rate of close to 200 tons daily. Central Cadillac continued to operate at a slightly increased rate, shipping its output, by truck, to the Thompson Cadillac mill for treatment. Increased operating difficulties forced suspension, in June, 1942, of all operations at the Wood Cadillac mine. The Pandora mine was another war casualty which, owing to the lack of sufficient labour, closed down in August for the duration of the war. Tonnage at Lapa Cadillac was gradually reduced by 40 per cent from the rate in effect at the beginning of the year. At West Malartic production was commenced in May, 1942, and in spite of the serious operating difficulties resulting from the scarcity of labour, the mill was brought up to its rated capacity of 300 tons per day.

In the Fournière-Malartic area, the average daily tonnage treated at the Canadian Malartic mine was increased to 983 tons, with little variation in grade from the figures for the previous year. At Sladen Malartic, tonnage was maintained at a steady rate of 700 tons per day, and gold recovery showed a substantial increase at \$4.49 per ton; No. 2 shaft was deepened during the year to the 1,750-foot horizon. At East Malartic, a slight reduction in tonnage treated, as compared with 1941, was almost wholly compensated by an improvement in grade. Malartic Goldfields operated at an average daily rate of 682 tons, with mill heads averaging \$8.20 gold per ton; at the No. 2 mine, half a mile to the west of the main workings, a shaft was completed to a depth of 500 feet, and lateral work has indicated that the promising results attained in previous diamond drilling will be confirmed.

In the Bourlamaque-Dubuisson area, an output of 1,000 tons per day was maintained at the Siscoe mine, but the grade of the ore has been appreciably reduced. Sullivan Consolidated increased production to an average daily rate of 462 tons, with grade averaging \$10.36 per ton in gold. At Lamaque, the severe shortage of labour resulted in a drastic curtailment of underground work, and, during the last six months of 1942, the daily tonnage was gradually reduced from 1,225 to 815 tons. Operations at the Sigma mine showed little change, the tonnage of ore treated amounting to 403,467 tons, with an average gold content of 3.926 dwt. per ton.

In the Pascalis-Louvicourt area, the Cournor mine and mill operated continuously throughout the first six months of 1942, but due to a fire which destroyed the mine office, the engineers' office and the warehouse, and the increasing wartime difficulties, the operations have been suspended for the duration of the war. Operations continued at a steady rate at the Perron mine, with production only slightly below the figures for the previous year; some shipments of sorted tungsten ore were made from this property.

Development and exploration work was continued on a number of new gold properties in Quebec during the first part of 1942, but as the difficulties resulting from shortage of labour and materials increased rather sharply, most of this work has been suspended, and there appears to be little prospect of its resumption until after the war.

GOLD MINES OF ONTARIO, 1942

(Maurice Tremblay, Statistician, Ontario Department of Mines)

East Kirkland and Larder Lake Areas.—All development and stoping at the Bidgood Kirkland mine was done in the No. 2 shaft workings from the 250 foot level to 1,275 feet. There was no change in plant or equipment and an average of 131 tons of ore per day was milled during the year. No. 1 shaft at Upper Canada was sunk 250 feet during the year and levels were established at 1,125 and 1,250 feet. Stoping is being carried out on the 125, 250 and 375 foot levels of No. 2 shaft and on all levels of No. 1 shaft down to the 875 foot level. In 1942 the mill treated an average of 231 tons of ore per day, this being an increase of 30 tons over the previous year. At the Omega property No. 3 internal shaft, a winze was collared on the 1,550 level in the southern part of the property. It was sunk 186 feet in 1942 and a level established at 1,675 feet. Average daily tonnage milled in 1942, 409 tons, was 60 tons below the 1941 daily average. One of the most important developments at the Kerr Addison property was the finding of No. 6 ore body south of the fault. This section of the property had heretofore been considered barren. Average daily tonnage treated in 1942 was 2,072 or 170 tons above the average for 1941. The main shaft, No. 3, was sunk 716 feet to a total depth of 2,805 feet. New levels were established at 150 foot intervals from the 2,200 foot level to the 2,800 foot level. The lowest level to be developed in this block, therefore, will be at 2,650 feet and the main production to come from the 2,500 foot level. There were no changes to plant or equipment at the Chesterville property. The shaft was sunk 458 feet during the year under review to a total depth of 1,703 feet and the 10th, 11th, and 12th levels established. Average daily tonnage treated in 1942 was 663 against 687 in 1941. At the Yama property milling operations were sporadic throughout the year. An average of 63 tons of ore per day was milled. Late in the year an attempt was made to increase capacity from 75 to 100 tons per day. Most of the development was carried on the bottom or 500 foot level. O. L. Knutson succeeded H. G. Wray as Manager in November. The old Margaret shaft or No. 1 Queenston shaft on the Queenston Gold Mines property was deepened to 272 feet and a second level established at 250 feet. Development was carried out on the 125 and 250 foot levels. A shipment of 1,054 tons of ore was milled in the Upper Canada mill as a bulk test. All work was done by the latter company. Operations were suspended for the duration of the war on April 15, 1942. Some diamond drilling was done underground at the Laguerre mine early in January, but on March 10 it was decided to suspend all operations for the duration. Toburn Gold Mines Ltd. pumped out the workings of Kirkland Consolidated Mine (Keryan Lease), in April and May of 1942. The property was examined for scheelite.

Kirkland Lake Area.—All operations were suspended on April 14, 1942, at both the Golden Gate and Crescent mines. They were allowed to flood. There was no further work done on the crosscuts into the Casakirk property from Macassa. The plant of the latter mine remained substantially the same. At the Kirkland Lake Gold Mining Company property development work and stoping was curtailed during the year. The major part of the development work was carried out in the block of ground from 4,600 to 5,450 feet. The most important work at this company was carried out on six veins of high class ore on the 5,450 level. The mill treated an average of 276 tons per day. The mill of Teck-Hughes Gold Mines Limited treated an average of 256 tons of ore per day, all of which came from above the 15th level. It will probably take longer than expected before mining of this upper block of levels is completed. Notwithstanding the strike, sinking of No. 6 shaft was carried on throughout the year at the Lake Shore mine. Footage sunk was 776 and new levels were established at 125-foot intervals from the 5,200-foot level. Development work was concentrated in the block of levels from 4,575 to 5,950. The mill treated an average of 950 tons per day. No new levels were opened up at the Wright-Hargreaves mine during the year and most of the development was done in the blocks from the 4,200 to the 5,400 and from the 200 to the 700 levels. Daily average tonnage treated for the year was 777 tons. At the Sylvanite mine the No. 5 winze was sunk 446 feet and levels were established at 3,900, 4,050 and 4,200 foot levels. Average daily tonnage was 480.

Porcupine District.—Gold ore tonnage milled during 1942 dropped below that of the preceding year for the first time in 12 years. Tonnage milled dropped from 5,971,786 in 1941 to 5,624,679 tons in 1942, a decrease of 5.95 per cent. However, this figure is much less than 1 per cent of the tonnage milled in the district in 1940. A comparison of tonnage and production of the Porcupine district with that of the province indicates the decline in the Porcupine district was less than the general decline production from Porcupine amounting to 48.75 per cent of the total highest figure since 1930, while the tonnage exceeded that of all the other Ontario gold mines combined for the first time since 1938. Employment decreased over the year by 10.35 per cent, but this does not reflect the great exodus of men in the latter months of the year. The December employment figures show a decrease of 2,418 men from the 1941 average, or a 25 per cent decrease. During the year, operations were suspended at DeSantis Porcupine Gold Mines, Faymar Porcupine Gold Mines, and Nakhodas Mining Company. With the exception of hoisting ore from stopes, mining also was suspended at Naybob Gold Mines at the close of the year. From August to November, 1942, Wolfestevé Mining and Development Company operated on the former Credo Porcupine property. Production of 292 tons of ore from open pit operations was trucked to Buffalo Ankerite Gold Mines for testing purposes.

There was little expansion during the year at producing mines. Preston was the outstanding exception in this respect. Near completion of mill expansion at the end of 1941 enabled this company to step up average production from 534 tons daily in 1941 to 840 tons in 1942. The step-up took place during the first three months, just prior to the passing of new regulations restricting increases in gold tonnages beyond that of the first three months of the year. Construction work and installation of new equipment at the Porcupine mines was done on a very modest scale in 1942. Preston completed early in the year additions to the mill, shops and power plant which were well on the way at the end of 1941. Aunor completed installation of additional mill equipment ordered in 1941, and received near the end of the year a new hoist which was also ordered many months earlier. The Hollinger scheelite mill was completed and the additions to the Delnite mill for the recovery of the same mineral were both completed in 1942.

Matachewan and West Shiningtree Area.—A considerable proportion of the ore milled at the Young-Davidson mine was extracted from pillars, and average daily mill tonnage dropped from 955 in 1941 to 816 in 1942. No additions were made to the plant. At the Matachewan Consolidated property the expansion program commenced in 1941 to bring mill capacity to 1,000 tons per day was completed in 1942. Shortage of labour prevented production of more than 900 tons per day. Mining from surface of the syenite ore body near the Young-Davidson line was started. The Tyrannite mine suspended operations for the duration of the war on July 31, 1942. During the period of operation, average daily tonnage treated was 148. It is likely that when the mine re-opens, considerable lower level development will be done before milling is resumed.

Sudbury and Nipissing District.—Development work totalling 2,118 feet was done in 1942 at the Jerome property. The mill treated an average of 462 tons per day. At the Rundle mine operations were continued until the end of July. The shaft was deepened to 375 feet and a second level opened up at 300 feet. The Renabie property was closed in May after development work, totalling 2,985 feet, had been done on the 125-250-foot levels during 1942. Lack of ore caused cessation of operations at the Cline Lake mine in November. The mill treated an average of 161 tons per day from January 1 to October 14. Regnery Metals handled an average of 35 tons per day from shallow under ground work. Operations there lasted from April 16 to December 21.

Thunder Bay District.—Little Long Lac Gold Mines, Limited, operated continuously during the year and the mill tonnage was held in the neighbourhood of 320 tons. Mining was done from the 10th level down. The winze from the 16th level, which is situated 1,680 feet west of No. 1 shaft was completed early in the year and four levels were established. A 15-ton scheelite concentrator was added to the mill and was in operation in January, 1943. MacLeod-Cockshutt was in continuous operation during 1942. It had been hoped to increase production. The mill building addition was completed and most of the mill units installed but the labour shortage became so acute that it was found difficult to maintain previous tonnage.

At the end of the year approximately 600 tons daily were being milled. The possibility of producing arsenic from the roasting plant fumes was being investigated. Continuous production was also maintained at the Hard Rock Gold Mine. Most of the tonnage milled was taken from the large shrinkage stopes between the 4th level and surface. No. 2 shaft was deepened during the year to a total depth of 1,410 feet and six new levels established at 150-foot intervals below the 4th. Investigation of possible production of arsenic was also being made at this property. The mill of the Magnet Consolidated mine was in continuous operation throughout the year, treating an average of 140 tons per day. The ore supply was mostly taken out between the 5th and 9th levels. Production at the Bankfield mine ceased on August 30. It was said that all commercial ore had been removed underground. There is, however, a possibility that the ore on the Magnet property to the east is raking toward the Bankfield at depth and for this reason the three levels from No. 1 shaft were bulkheaded off so that in future it would not be necessary to pump out the mine workings in the event of the reopening of the mine. The Tombill mine ceased operating on November 30 for the same reason as Bankfield. The Elmos operation of this company witnessed the installation of a mining and milling plant of 40 tons capacity. The mine was also closed on November 30 and the underground allowed to fill with water. In the Sturgeon River area, the Sturgeon River mine ceased operations in October owing to a lack of labour. At the Bregold property some sampling was done after the mine had been dewatered but owing to the difficult times, work was discontinued in March. In the Beardmore area the Leitch mine operated its plant during the year and established itself as the highest grade gold mine in Canada. Daily tonnage was about 110 tons hoisted and 80 tons milled. Development of five new levels was practically completed during the year. Ore developed on these levels was as good or better than the upper levels. The mill feed for the year came mostly from the section between the 5th and 9th levels. Some scheelite was produced at the property and two small shipments were made to Ottawa. Owing to the labour shortage the Sand River operation of the Northern Empire Mines, Limited, was closed on August 26. Some scheelite ore was shipped from this mine. The Bandolac Mining Company, Limited, in the Shebandowan Lake area moved prospecting equipment on its property which is situated in the vicinity of the Shebandowan Station on the C.N. Railway. The property will probably be dormant for the duration. Several of the larger mining companies have had scouts examining prospects in this area.

Rainy River District.—Goldorel Mining Company, Limited, operated the old Olive Gold mine at about 20 tons daily till August 21 when a fire destroyed both the Diesel plant and mill. No further work has been done. This company was also interested in the old Golden Star property south of Mine Centre but no work was done there during the year.

Kenora District.—The Berens River mill treated a daily average of 238 tons of ore during the year. Plans were being made to enlarge the mill building and to install equipment necessary for the extraction of zinc which formerly followed the tailings. Central Patricia was in continuous operation and the winze which had been collared on the 2,050-foot level during the latter part of 1941 was deepened 578 feet during 1942. Four new levels were established. Three new levels were opened up at the Pickle Crow mine. This followed deepening of the winze which had been collared on the 750-foot level in 1941. Mining operations ceased at the No. 5 shaft of the Uchi mine on November 30, 1942. At the end of the year only No. 2 and No. 4 shafts were producing. The mill treated an average of 454 tons of ore daily. Continuous operations were reported also from the McKenzie Red Lake and the McMarnac mines. The former mined an average of 235 tons of ore daily and the latter 90 tons. There was nothing new to report from the Cochenour Willans mine. The mill treated an average of 165 tons of ore per day. Production at the Hasaga mine averaged 367 tons per day during 1942 and Madsen Red Lake had an average daily run of 400 tons. Although the Wendigo mine operated throughout the year under review, discouraging results from diamond drilling on the 1,700-foot level in January of 1943 caused the company to begin salvage operations. Attempts to retreat the old mill tailings at the Goldwood property were unsuccessful. The tailings are covered by 35 feet of water. Some 5,000 tons of tailings were treated between February 20 and May 31, 1942. At the Gold Frontier mine development work was done from January to July 9. Some drifting was done from the No. 1 shaft and drifting and crosscutting from the No. 2 shaft. Mine buildings were erected at the No. 2 shaft. The mill equipment that was delivered to the landing during

the latter part of 1941 is still there. The Jason mine was operated from January 1 to October 10, milling an average of 94 tons of ore per day. Equipment that could be damaged by water was brought to surface and the mine allowed to flood. It is planned to re-open the property after the war. Shortage of labour was mainly responsible for the closing down of the mine. Underground exploratory work was carried on at the Kenwest property from January 1 to February 15. At that time the mine was allowed to flood to the third level. Underground operations were resumed on October 9 and continued throughout the year. The Gurney mill purchased in 1941 was installed at the property and milling operations started on the 1st of September. By the end of the year a total of 3,015 tons of ore that had been stored on the surface dump and 3,309 tons of ore obtained from the underground workings had been treated. Owing to the war, plans to retreat the tailings from the old Micado mine, on Shoal Lake, had to be abandoned, but some trenching was completed during the year on the company's holdings at High Lake. Sandybeach Lake Syndicate took a 5½-ton sample from Claim K.9194 near Kirk Lake, south of the old Sakoose mine. The ore was trucked to the mill at Van Houten Gold Mines and was sampled there. Production of bullion from this ore amounted to \$83.66.

MANITOBA GOLD INDUSTRY, 1942

(Geo. E. Cole, Director of Mines)

The province of Manitoba continued its gold production in 1942 with 136,226 ounces as compared with 150,553 ounces in 1941. Gold was produced at four gold-quartz mines and was also obtained from the treatment of base metal ores of the Flin Flon and Sherritt-Gordon mines.

Prospecting for gold was overshadowed in 1942 by the search for strategic minerals which resulted in the discovery of chromite in the Bird River area of southeastern Manitoba. Nevertheless, there was some interest shown in the development of a gold property at Snow Lake, The Pas Mining District, by the Howe Sound Exploration Company, Limited.

After an intensive campaign of diamond drilling at the Nor-Acme property located some 10 miles northeast of Herb Lake (Wekusko) settlement, results were reported so satisfactory as to warrant taking over the property and commencing mining operations when world conditions were more settled. Following on these reports there has been considerable prospecting in the area.

The Gunnar Gold mine, which up to 1942 had for several years been producing at the rate of 150 tons a day, on \$11.00 ore, was forced to discontinue operations in June. The company acquired the Ogama-Rockland group of claims, located 6 miles northwest of the Gunnar mine after some preliminary drilling. Preparations were made to develop and work two small ore shoots on the Ogama claim but owing to unsatisfactory conditions imposed on gold production during the war, mining could not be continued.

SASKATCHEWAN GOLD MINING INDUSTRY, 1942

(W. H. Hastings, Chief Inspector of Mines)

Saskatchewan's gold production for 1942 was 178,871 ounces valued at \$6,886,533 as against 138,015 ounces valued at \$5,313,578 in 1941, or an increase of 29.6 per cent. In January the surface buildings of Pamon Gold Mines Limited, Amisk Lake, burned down, and on August 15, 1942 Consolidated Mining and Smelting Company of Canada, Limited closed their Box property mine at Beaverlodge, Lake Athabaska, for the duration of the war. The closing of these two mines left the Flin Flon mine of Hudson Bay Mining and Smelting Co. as the only operating gold producer in Saskatchewan.

As the Flin Flon mine accounted for approximately 90 per cent of the total gold production of the province, the closing of the mines at Amisk and Athabaska Lakes will not greatly affect the production figures of future years. As long as the Hudson Bay Mining Company continues in its present healthy state of operation, Saskatchewan's gold production should remain in the neighbourhood of \$6,000,000 annually.

No new discoveries were reported during the year under review. Preview Mines Limited, a prospect in the Lac la Ronge area, operated a small pilot mill during the early part of the year but later discontinued operations indefinitely. Wampum Gold Mines Limited at Douglas Lake, six miles south-west of Flin Flon, an arsenical gold property, also failed to reach the production stage in their development operations.

BRITISH COLUMBIA GOLD MINING INDUSTRY, 1942

Submitted by H. Sargent, Chief Mining Engineer, British Columbia Department of Mines
(Prepared by the Mining and Metallurgical Division, Bureau of Economics and Statistics
Victoria)

In the Atlin Mining Division the Polaris-Taku Mining Company treated a total of 31,336 tons of ore, the concentrates being shipped to the Tacoma smelter. This operation was closed down, presumably for the duration, at the end of April.

The Portland Canal Division was credited with a tonnage output of 203,322, of which the Silbak Premier produced 140,567 tons containing 36,300 ounces of gold. The Big Missouri mill treated 62,755 tons, closing down in April, and finally, in October the operation ceased altogether. In the Skeena Mining Division, the Surf Inlet Consolidated Gold Mines Ltd., was credited with 26,116 tons treated, with gold production of 8,683 ounces. The company ceased operations at the end of November. The Government sampling plant at Prince Rupert, handled several small lots of ore and numerous testing lots. Settlement is made direct with the shipper, and accumulated stocks are shipped by the Department of Mines, to Tacoma or Trail, as the character of the ore determines.

The Cariboo Division had 141,801 tons credited, of which the Cariboo Gold Quartz treated 93,885 tons, with gold content of 38,016 ounces. The Island Mountain Mines Ltd., treated 47,916 tons, giving a content of 21,164 ounces of gold.

Clean-up operations, by leasers, continued at the Windpass in the Kamloops Division and in the Vernon Division the Kalamalka mine is credited with 433 tons.

The Greenwood Division again disclosed that the Old Granby (Phoenix), Providence, and Union Mines were the main producers in the total of 2,113 ounces of gold. Leasing operations at the Dentonia continued, and production was made from the Yankee Boy.

The Osoyoos Division came close to the tonnage and production of 1941, and in 1942 tonnage was 165,643 and 55,011 ounces of gold produced. Hedley Mascot treated 66,088 tons which yielded 22,477 ounces of gold. The Kelowna Exploration, operating the old Nickel Plate mine, treated 99,219 tons. Smaller producers included the Empire, Grandoro, K.C.M. and Smuggler.

The Copper Mountain property of the Granby Consolidated Mining, Smelting and Power Co. Ltd., can be credited with several thousand ounces of gold.

The Nelson Mining Division was credited with a total of 183,384 tons treated, which yielded 65,663 ounces of gold. The leading producer was Sheep Creek Gold Mines Ltd., with 55,395 tons yielding 23,493 ounces of gold, followed by Gold Belt with 55,299 tons yielding 19,619 ounces of gold. Kootenay Belle treated 26,016 tons for a yield of 8,310 ounces of gold. Bayonne is credited with a yield of 4,599 ounces from 11,524 tons treated. Clean-up work was carried out at the Reno, and it is reported the property has been sold to Messrs. Endersby, who for some years worked the Nugget claim on a lease.

Other shippers in the Nelson Division included Alpine, Arizona, Arlington, California, Granite Poorman, Wilcox, Yankee Girl, now being worked by leasers. In addition, shipments were made by the Bunker Hill, Clubine-Comstock, Durang, Goodenough, Ymir leasers, Trimetals (Golden Age), Gold Hill, Jessie Victoria, and Keystone.

Trail Creek had a total tonnage of 12,565 which yielded 4,135 ounces of gold. The Velvet was the largest producer with 7,595 tons treated, followed by Rossland leasers with 3,999 tons treated.

In the Alberni Division, the Thistle and Sherwood made aggregate shipments of 1,141 tons, which yielded 288 ounces.

The Clayoquot Division tonnage was 68,100 with a total yield of 41,136 ounces. Privateer again topped the list with 22,360 ounces of gold from 25,073 tons treated. Spud Valley came next with 6,020 ounces from 20,060 tons treated, followed by Central Zeballos with 4,610 ounces. Other producers were Buccaneer, Muskateer, White Star, Homeward and Mount Zeballos. The following mines are now closed down: Buccaneer, Mount Zeballos, Homeward, Muskateer, Central Zeballos, Spud Valley and White Star.

Lillooet Division, with two producing Mines, is credited with 250,719 tons, of which Bralorne treated 171,095 yielding 90,817 ounces of gold. The Pioneer treated 79,624 tons with a yield of 40,563 ounces of gold.

Nanaimo and New Westminster divisions added a few tons to the Provincial total, and Britannia Mine in the Vancouver Division also was responsible for some thousands of ounces, but same is tied in with copper-production data, and cannot be segregated.

GOLD MINING IN THE NORTHWEST TERRITORIES, 1942

(A. W. Jolliffe, Ph.D., Geological Survey—Ottawa)

Curtailment of all phases of the gold mining industry in Northwest Territories took place during 1942. Two of the six mines producing at the start of the year were closed, and one new mine operated for less than a month. The total daily tonnage milled at Northwest Territories gold mines dropped from about 450 at the start of the year to about 300 at the end. Prospecting was on a much reduced scale as compared with previous years and much of this was devoted towards the search for scheelite and other war minerals rather than for gold. Staking and development of gold claims practically ceased. Notwithstanding, gold was produced to a value of \$3,826,669, nearly one-quarter larger than the amount produced in 1941, and representing about 63 per cent of the value of all minerals produced in Northwest Territories in 1942. Since September, 1938, when continuous production started, gold valued at over ten and one-half million dollars has been produced.

Con and Rycon mines on Yellowknife Bay are operated from a common plant by Consolidated Mining and Smelting Company of Canada, Limited. In 1942 the property maintained its position as chief gold producer in Northwest Territories, treating an average of nearly 200 tons a day. No. 1 shaft was deepened from 1,011 to 1,450 feet with stations cut at 1,100, 1,250, and 1,400 feet. About 6,600 feet of lateral work was done in the mines during the year, chiefly on the 950-, 650-, and 500-foot levels. Most ore treated to date has come from Con mine above the 650-foot level. The deepest ore known is on the 950-foot level. Extension of mill capacity to 350 tons daily, with installation of a Hadsell mill, roaster, and leaching plant, were completed in April, 1942, but shortage of labour prevented full use. An average of 286 men were employed during the year. Ore reserves are not available for publication.

Negus mine is situated immediately south of the Con-Rycon property and is the third largest gold producer in Northwest Territories, milling an average of 70 tons daily and recovering gold valued at over \$700,000 in 1942. No. 2 shaft was deepened from 734 to 800 feet during the year and lateral work therefrom amounted to about 2,910 feet, chiefly on levels at 300, 425, and 550 feet, and on a sub-level at 140 feet. About 87 men were employed. Ore reserves are reported to have increased during the year from 19,000 tons carrying 0.637 ounces of gold per ton to 27,500 tons carrying 0.82 ounces gold per ton.

Ptarmigan Mines Limited, controlled by Consolidated Mining and Smelting Company of Canada, Limited, are located about five miles northeast of Yellowknife, entered production in January, 1942. Up until the time the property closed down in September, 1942, due to labour shortage, about 125 tons were treated daily. The property was worked from a single shaft put down to a depth of 923 feet with levels at 150-foot intervals, and from about 5,760 feet of lateral workings, all completed prior to 1942. About 95 men were employed at the property. Ore reserves are not available for publication.

Ruth mine, owned and operated by Consolidated Mining and Smelting Company of Canada, Limited, lies about 60 miles east of Yellowknife and is connected by a winter road with Francois Bay on the east arm of Great Slave Lake. A 25-ton mill at the property operated from August 1 to 12. Ore milled represents about 70 per cent of the tonnage mined, the remainder being wall rock which is removed on a picking belt. All ore stoped has come from above the 100-foot level. A second level at 200 feet has been established. About 26 men were employed at the property during the milling period. Ore reserves are not available for publication.

The property of Thompson Lundmark Gold Mines, Limited, lies about 50 miles east of Yellowknife by winter road, and is operated by Consolidated Mining and Smelting Company of Canada, Limited. During 1942 an average of about 103 tons were treated daily, averaging about 0.60 ounces gold a ton. No. 1 shaft on Kim vein was deepened from 325 to 650 feet while No. 2 shaft on Fraser vein remained at a depth of 834 feet. Both shafts are inclined at about 50 degrees and levels have been established at 150-foot intervals measured down the slope. About 1,470 feet of lateral underground work were completed, chiefly on the third and fourth levels. All ore mined in 1942 was taken from Fraser vein. About 95 men were employed on the average. Ore reserves were reported to be 63,639 tons averaging 0.59 ounces gold per ton, and 57,894 tons averaging 0.44 ounces at the beginning and end of 1942 respectively.

International Tungsten Mines, Limited (formerly Slave Lake Gold Mines, Limited) operating on Outpost Islands, Great Slave Lake, for the first eight months of 1942 recovered gold in bullion, copper concentrates, and tungsten concentrates. No. 1 shaft was deepened to include a new level at 525 feet; No. 2 shaft, situated about 2,000 feet to the west, was also extended. An average of 49 men were employed. Ore reserves are not available for publication.

YUKON

(G. A. Jeckell—Controller, Yukon)

In the Dawson District, eleven grants were issued for lode mining and one hundred and nine claims were renewed. No work other than necessary representation work was done. Only one claim was renewed under the exemption granted by Order in Council P.C. 7750, dated September 2, 1942.

In the Mayo District, three hundred and thirty-eight claims were kept in good standing, and one hundred and thirty-two claims were held under twenty-one year leases. No claims were renewed under exemption granted by Order in Council P.C. 7750. The Treadwell Yukon Corp. carried on no mining operations in 1942 and the equipment of the company was largely disposed of. There was no lode mining activity in the District, aside from that done by three laymen on the "Sadie", "Elsa" and "Calumet" mineral claims. Promising discoveries of scheelite ore were made late in the fall of 1942 on Lynx Fork Creek, a tributary of Haggart Creek, and Cement and Scheelite Creeks in the Johnson Creek area, but no work was done on these prospects during the winter months.

Table 42.—Principal Statistics of the Entire Auriferous Quartz Mining Industry in Canada, for Years Specified

	Number of active operators	(c) Number of operating plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	(b) Cost of process supplies used	Value of freight paid on shipments of ore, slag, etc.	Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines (d)	Net value of bullion, ore, concentrates or residues shipped from mines (d)
	65	65	\$ 77,574,976	5,524	\$ 8,961,434	\$ 1,497,197	\$	\$	\$	(a) 25,021,837	\$
1923.....	80	85	135,166,105	8,660	14,258,733	2,579,481	Data not available	Data not available	(a) 37,275,986	Data not available	Data not available
1929.....											
1941—											
Nova Scotia.....	11	12	440,528	261	315,154	52,019	99,474	1,127	8,188	737,740	576,932
Quebec.....	88	93	42,741,363	6,386	11,502,809	1,854,389	3,877,009	87,177	474,890	31,386,312	25,092,847
Ontario.....	96	99	169,500,184	21,007	40,824,236	5,427,354	13,758,759	375,075	1,365,347	120,703,979	99,777,444
Manitoba.....	6	6	3,717,198	637	1,196,305	185,367	411,649	6,720	34,437	3,095,461	2,454,288
Saskatchewan.....	3	3	17,529	204	424,295	27,715	274,518	18,783	20,599	941,372	599,757
British Columbia.....	127	137	22,929,476	3,511	6,731,978	735,291	2,309,123	421,840	747,455	19,378,045	15,164,331
Northwest Territories.....	7	7	3,792,586	545	1,156,063	177,453	336,363	5,601	27,592	2,860,273	2,313,234
Yukon.....											
Canada.....	338	357	243,138,864	32,551	62,150,810	(e) 8,462,618	21,066,900	916,323	2,678,508	179,103,182	145,978,833
1942—											
Nova Scotia (f).....	6	6	318,438	104	158,602	34,857	37,921	1,782	4,166	370,225	291,469
Quebec.....	50	50	38,379,170	5,736	11,381,876	1,763,640	4,174,550	111,979	540,223	31,413,162	24,822,761
Ontario.....	73	75	175,289,245	16,576	35,079,849	4,833,352	11,383,741	192,431	1,159,232	104,472,446	87,143,640
Manitoba.....	8	8	6,011,285	483	1,060,211	173,162	323,897	6,306	31,933	3,284,248	2,748,980
Saskatchewan.....	3	3	17,100	113	231,088	12,303	323,897	1,785	5,720	3,284,248	343,910
British Columbia.....	77	78	17,901,610	2,439	5,058,044	549,698	1,524,325	402,705	504,992	16,629,819	13,587,900
Northwest Territories.....	6	7	7,324,149	579	1,418,362	248,717	547,567	24,341	39,978	3,860,275	2,999,372
Yukon.....										840	
Canada.....	223	227	245,240,997	26,030	54,388,872	7,615,766	17,922,522	741,329	2,316,264	160,564,783	131,935,902

(a) Less freight and treatment charges.

(b) Explosives, chemicals, etc.

(c) Number of mines producing—1923—33; 1929—33; 1937—189; 1938—226; 1939—232; 1940—278; 1941—255; 1942—184.

(d) Value of bullion produced plus value of ore, concentrates, etc. shipped.

(e) Includes \$7,415,094 in salaries in 1941 and \$6,979,550 in 1942.

(f) Does not include data for Queens Mines Ltd.

NOTE.—Net Value represents the gross value less the cost of fuel and electricity, process supplies freight and treatment charges.

Table 43.—Principal Statistics Relating to Producers Only in the Auriferous Quartz Mining Industry in Canada, 1942

Province	Number of producing plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	(a) Cost of process supplies used	Value of freight paid on shipments of ore, slag, etc.	(b) Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines (d)	Net value of bullion, ore, concentrates or residues shipped from mines (d)
Nova Scotia (f)	4	315,863	102	158,249	30,558	36,469	1,782	4,166	370,225	297,250
Quebec	29	36,097,240	5,649	11,240,958	1,746,477	4,164,204	111,979	540,223	31,413,162	24,850,219
Ontario	67	174,324,939	16,511	34,944,578	4,814,236	11,122,630	192,431	1,150,252	104,472,446	87,183,897
Manitoba	7	6,011,285	483	1,060,211	173,162	323,897	6,306	31,933	3,284,248	2,748,980
Saskatchewan	3	17,100	113	231,088	12,303	170,050	1,785	5,720	533,768	343,910
British Columbia	67	17,679,569	2,377	4,971,227	545,203	1,515,120	402,705	564,992	16,629,819	13,001,799
Northwest Territories	7	7,324,149	579	1,418,302	248,717	547,867	24,341	39,978	3,860,275	2,999,372
Yukon									840	840
Total Canada 1942	184	241,770,145	25,814	54,033,613	7,570,656	17,880,267	741,329	2,346,264	160,564,783	132,026,267
Total Canada 1941	255	231,635,873	31,850	61,063,035	(e) 8,336,180	20,721,498	916,323	2,678,508	179,103,132	146,450,673
Total Canada 1940	278	230,719,341	30,353	53,560,938	7,935,193	20,390,784	691,619	2,486,587	178,794,078	147,289,865
Total Canada 1939	232	214,326,089	29,001	50,591,920	(e) 7,701,026	19,001,782	694,165	2,249,312	160,014,172	130,367,887

(a) Explosives, etc.

(b) Includes handling charges.

(c) Not recorded separately—included with data relating to non-ferrous smelting industry in British Columbia.

(d) Value of bullion *produced* plus value of ore, concentrates, etc. *shipped*.

(e) Includes \$7,214,016 in salaries in 1941; \$6,794,255 in 1940 and \$6,878,890 in 1942.

(f) Does not include data for Queens Mines Ltd.

Table 44.—Ores Mined and Milled, Crude Bullion Recovered and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1942

	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories	Yukon	Canada
Number of producing mines.....	4	29	67	7	3	67	7		184
Ore mined..... tons	28,886	4,802,534	11,067,105	285,015	291,787	1,100,005	146,934		17,722,866
Material discarded (sorted)..... tons	7,248	166,914	419,242	918		64,117			17,638,439
Ore milled..... tons	18,885	4,340,768	10,651,204	284,607	291,808	1,049,864	174,306		16,820,142
Tailings retreated..... tons		5,212	75,917			34,979	52,587		5,176
Concentrates produced..... tons			40,638			142,681			168,695
Gold content of ores, slag, residues and concentrates shipped—									
To foreign smelters..... fine oz.	69	37,157	2,486			8,914	631		183,850
To Canadian smelters..... fine oz.					4				48,630
Bullion bars shipped—									
Gold content.....	9,443	773,195	2,711,532	75,281	13,688	269,539	98,880		3,551,549
Silver content.....	298	152,332	470,177	11,487	5,745	70,906	22,442		238,387
Bullion produced by amalgamation.....	10,047	59,897	223,133	17,549		118,160	55,651		584,437
Bullion produced by cyanidation.....	12	967,125	2,958,096	86,405	21,618	207,087	55,352		4,295,785
Total Bullion Produced.....	10,059	1,027,022	3,281,229	104,014	21,618	325,247	111,033		4,880,222
Content of bullion bars produced—									
Gold.....	9,730	772,964	2,649,077	85,144	13,799	269,604	98,651		3,898,999
Silver.....	298	152,332	457,718	12,494	5,745	69,670	22,510		271,287
Gold value (standard).....	195,233	15,979,204	54,761,136	1,700,049	288,240	5,572,874	2,037,294	(a)	80,591,032
Silver value.....			182,733	4,931	2,233	26,627	8,786		289,877
Exchange premium on bullion bars produced.....	168,276	13,788,068	47,235,286	1,577,968	246,105	4,808,142	1,758,766		69,315,768
Value of ores, concentrates, slag and residues sold (shipped).....	(b)	1,588,442	2,293,291	1,300	(b)	6,222,176	55,429	840	10,168,166
Total Gross Value of Production.....	370,225	31,413,162	104,472,446	3,284,248	533,768	16,629,819	3,800,275	840	1160,561,783
Value of fuel, electricity and process supplies used, also freight on shipments, marketing, smelter and refining charges.....	78,726	6,500,401	17,328,806	535,268	189,858	3,041,919	800,903		28,625,881
Net Value of Production.....	291,499	24,922,761	87,143,640	2,718,980	343,910	13,587,900	2,999,372	840	1131,935,902

(f) Value of tungsten concentrates recovered from crude alluvial material treated at Ottawa by the Bureau of Mines (shipments from the Ottawa mill are recorded as production.)

(a) In addition, there were 1,465,082 ounces of silver contained in concentrates, etc., shipped to smelters; see following table.

(b) Includes for convenience value of tungsten shipped from mines other than gold.

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Table 45.—Ores, Concentrates, Slag, Etc., Shipped to Smelters from Canadian Gold Mines, 1929-1942

	To Canadian plants						To Foreign plants					
	Ores		Concentrates		Slag, residues, precipitates		Ores		Concentrates		Slag, residues, precipitates	
	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.
1929.....	27,278	14,327	268	305	1	24	90,871	82,996	2,370	3,638	6	304
1930.....	52,540	22,910	1,187	9,665	2	117	70,497	22,432	18,276	46,102	53	1,009
1931.....	51,579	21,756	3,120	16,805	12	1,505	24,224	11,870	20,271	48,743	47	1,306
1932.....	36,397	17,943	191	952	26	1,416	36,736	15,810	16,925	52,508	30	869
1933.....	30,066	14,852	490	1,349	55	6,279	3,292	2,203	29,111	76,601	34	1,392
1934.....	48,106	29,688	2,490	10,440	203	1,487	1,419	1,936	43,053	114,476	27	599
1935.....	18,239	7,008	7,045	35,958	58	6,231	1,242	2,840	46,050	90,167	25	11,310
1936.....	4,705	6,567	7,865	34,654	64	3,609	1,864	3,421	65,860	137,273	25	16,903
1937.....	37,126	9,649	6,981	21,865	130	2,060	2,516	8,108	62,987	163,781	74	912
1938.....	172,377	36,008	8,404	25,552	37	420	4,445	8,443	40,828	142,513	1,281	23,101
1939.....	271,666	47,114	7,747	24,184	797	4,507	3,853	8,930	39,530	112,126	235	26,631
1940.....	201,941	34,315	4,485	13,532	158	3,761	7,453	8,107	44,570	125,704	103	47,160
1941.....	202,943	38,380	1,628	7,492	369	4,444	7,453	11,222	43,855	122,619	115	56,183
1942.....	280,978	38,492	2,555	7,307	137	2,831	1,356	1,020	40,428	126,931	68	55,999
Grand Total.....	1,435,971	339,039	54,456	210,060	2,049	38,691	257,221	189,338	513,914	1,363,182	2,123	213,678

NOTE.—In addition, other material contained in ores shipped by gold mines to Canadian plants in 1942 included: Silver, 56,338 fine ounces; copper, 394,087 pounds; lead, 38,404 pounds; zinc, 55,754 pounds; crude As₂O₃, 5,291,790 pounds, and tungsten concentrates 166,732 pounds.

NOTE.—In addition, other material contained in ore exported by gold mines in 1942 included: Silver, 1,408,724 fine ounces; copper, 439,333 pounds; lead, 3,142,701 pounds; tungsten concentrates, 98,200 pounds; 7,114,751 pounds arsenic in ore (not paid for) and 2,148,000 pounds crude As₂O₃ and 36,693 pounds cadmium.

Table 46.—Ores, Concentrates and Slag Shipped from the Auriferous Quartz Mines in Canada, 1942

	Ontario mines shipping		Quebec, Manitoba, Nova Scotia, Saskatchewan, Northwest Territories and Yukon mines shipping		British Columbia mines shipping		Canada
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	
Number of mines.....	18	5	14	2	47	21	107
Tons of ore, etc., shipped.....	7,157	3,382	269,402	1,729	10,701	38,222	330,593
Metal content—							
Gold.....oz.	2,486	40,638	37,230	631	8,914	142,681	232,580
Silver.....oz.	7,551	861,182	3,509		45,298	547,542	1,465,082
Copper.....lb.	10,318	392,771	383,769	77,443		469,119	1,333,420
Lead (a).....lb.		1,288,530			98,404	1,854,171	3,241,105
Antimony (b).....lb.							
Arsenic.....lb.			5,291,796	2,148,000		7,114,751	14,554,547
Zinc.....lb.					55,754		55,754
Tungsten concentrates*.....lb.	116,193		6,989*	18,968	182,872*		*325,022
Cadmium.....lb.						36,693	36,693
Value—Gross..... \$	241,036	2,052,255	1,574,362	78,337	554,434	5,667,742	10,168,166

(a) Some B.C. gold ores exported contain relatively large quantities of lead which are not reported by the producer; this lead is reported by the U.S. Smelters and 50 per cent is credited to Canadian lead production.

(b) Any antimony recovered from Canadian ores in Canadian smelters is not usually reported by mine operators.

(*) WO₃ content; B.C., Nova Scotia and Manitoba content includes WO₃ recovered from all types of ores.

Table 47.—Specified Costs per Ton of Ore Milled at certain of the Principal Auriferous Quartz Mines in Canada, 1942

Name of Mine	Development and exploration (a)	Mining	Milling	General (b)	Total Cost per Ton (c)	
					1942	1941
QUEBEC						
	\$	\$	\$	\$	\$	\$
Beattie Gold Mines Ltd.....	0-270	0-676	1-018	0-381	2-345	2-334
Belleterre Quebec Mines Ltd.....	1-697	3-696	1-250	1-949	8-592	7-825
Central Cadillac Mines Ltd.....	1-065	3-180	1-285	1-117	6-647	(h)
Cournor Mining Co. Limited.....	1-533	3-721	1-034	0-360	6-648	(h)
Francoeur Gold Mines Ltd.....	0-24	2-15	1-42	1-03	4-84	3-886
Lamaque Mining Co. Ltd.....	0-93	2-43	0-71	2-64	6-71	5-213
Lapa Cadillac Gold Mines Ltd.....	0-702	2-762	1-216	0-733	5-413	4-266
Malartic Gold Fields Ltd.....	1-056	2-862	0-773	0-743	5-434	4-545
McWatters Gold Mines Ltd.....	0-41	3-03	1-46	0-93	5-83 (d)	6-646
O'Brien Gold Mines Ltd.....	1-71	4-27	1-49	1-40	8-87	7-07
Pandora Limited (e).....	0-48	3-10	1-11	0-68	5-37	5-012
Perron Gold Mines Ltd.....	2-015	3-512	1-012	0-974	7-513	7-347
Powell Rouyn Gold Mines Ltd. (f).....	0-43	1-81	0-94	0-37	3-55	3-31 (g)
Senator-Rouyn Ltd.....	0-81	1-49	1-00	1-31	4-61	5-64
Sigma Mines (Quebec) Ltd.....	0-595	2-291	0-566	0-242	3-604	4-428
Siscoe Gold Mines Ltd.....	0-49	1-74	0-86	0-66	3-75	4-37
Sladen Malartic Mines Ltd.....	0-63	1-33	0-68	0-69	3-33	2-71
ONTARIO						
Porcupine District						
Bonetal Gold Mines Ltd.....	1-14	1-99	1-52	0-31 (i)	4-96	.....
Broulan Porcupine Mines Ltd.....	0-37	2-38	0-75	0-37	3-87	3-78
Buffalo Ankerite Gold Mines Ltd.....	0-66	2-88	0-74	0-96	5-24	(h)
Coniaurum Mines Ltd.....	1-96	3-45	0-79	1-146	7-66	7-30
Dome Mines Ltd.....	0-956	1-843	0-979	3-116	6-894	7-193
Faymar Porcupine Gold Mines Ltd (j).....	0-186	1-831	1-506	0-496	4-019	(h)
Hollinger Cons. Gold Mines Ltd. (Timmins)	1-1049	3-0168	0-6622	1-8985	6-6824	6-5168
Hollinger Cons. Gold Mines Ltd. (Ross).....	0-1361	2-2763	1-7437	1-3290	5-4851	6-3125
Hoyle Gold Mines Ltd.....	0-13	1-67	0-95	0-67	3-42	(h)
McIntyre Porcupine Mines Ltd.....	0-669	4-062	0-870	1-887	7-488	7-375
Pamour Porcupine Mines Ltd.....	0-43	1-05	0-57	0-30	2-35	2-80
Paymaster Cons. Mines Ltd.....	1-15	3-17	1-14	0-50	5-96	6-62
Preston East Dome Mines Ltd.....	1-1483	3-0622	0-7855	0-7911	5-7871	(h)
Kirkland Lake District						
Bidgood Kirkland Gold Mines Ltd.....	1-61	4-79	1-53	1-16	9-09	10-48
Golden Gate Mining Co. Ltd. (k).....	1-77	3-31	2-13	1-67	8-88	9-58
Kirkland Lake Gold Mining Co. Ltd.....	1-43	4-61	1-31	3-08	10-43	8-40
Macassa Mines Ltd.....	0-87	3-64	1-25	4-15	9-91	10-07
Teck-Hughes Gold Mines Ltd.....	.....	3-82 (l)	1-35	2-36	7-53	7-53
Toburn Gold Mines Ltd.....	2-26	4-09	2-87	(h)	(h)	9-70
Upper Canada Mines Ltd.....	1-44	4-04	0-99	3-04	9-51	9-05
Wright Hargreaves Mines Ltd.....	.....	4-799	1-282	5-024	11-105	10-731

Table 47.—Specified Costs per Ton of Ore Milled at certain of the Principal Auriferous Quartz Mines in Canada, 1942—Concluded

Name of Mine	Develop- ment and exploration (a)	Mining	Milling	General (b)	Total Cost per Ton (c)	
					1942	1941
	\$	\$	\$	\$	\$	\$
Larder Lake District						
Chesterville Larder Lake Gold Mining Co. Ltd.....	0-451	1-434	0-841	0-467	3-193	3-36
Kerr Addison Gold Mines Ltd.....	0-636	1-330	0-656	0-367	2-989	4-08
Omega Gold Mines Ltd.....	0-679	2-716	1-258	0-126	4-779	4-291
Yama Gold Mines Ltd.....	(h)	(h)	(h)	(h)	(h)	11-25
Matachewan and Sudbury Districts						
Hollinger Cons. Gold Mines Ltd. (Young- Davidson).....	0-1142	1-2170	0-8112	1-0494	3-1918	3-0813
Jerome Gold Mines Ltd.....	0-233	2-518	0-821	0-928	4-500	4-302
Matachewan Cons. Mines Ltd.....	0-134	1-225	0-712	0-355	2-428	3-601
ONTARIO—Concluded						
Thunder Bay and Kenora Districts						
Bankfield Consolidated Mines Ltd. (m).....	0-0428	2-1760	1-4655	0-8363	4-5206	7-0192
Leitch Gold Mines Ltd.....	3-77	7-08	2-44	(h)	(h)	18-73
MacLeod-Cockshutt Gold Mines Ltd.....	1-0417	2-9323	1-6515	2-1211	7-7466	6-8268
Wendigo Gold Mines Ltd (f).....	1-37	4-36	2-39	1-29	9-41	9-34
Patricia District						
Central Patricia Gold Mines Ltd.....	1-53	3-15	1-17	1-08	6-93	8-51
Hasaga Gold Mines Ltd.....	0-38	1-4060	0-8321	1-2469	3-865	(h)
Jason Mines Ltd. (n).....	1-874	4-941	1-682	1-636	10-183	9-389
McKenzie Red Lake Gold Mines Ltd.....	0-99	3-38	1-21	1-00	6-58	6-77
McMarnac Red Lake Gold Mines Ltd.....	1-760	2-700	1-780	1-684	7-924	(h)
Pickle Crow Gold Mines Ltd.....	0-94	4-07	1-08	1-43	8-52	(h)
Uchi Gold Mines Ltd.....	0-554	2-825	0-999	0-404	4-782	(h)
MANITOBA AND SASKATCHEWAN						
God's Lake Gold Mines Ltd.....	1-85	2-43	1-56	1-80	7-64	9-21
Cons. Mining & Smelting Co. of Canada Ltd. (Box).....	(h)	(h)	(h)	(h)	(h)	(h)
NORTHWEST TERRITORIES						
Con Mine.....	(h)	(h)	(h)	(h)	(h)	(h)
Rycon Mines Ltd.....						
Negus Mines Ltd.....						
Thompson-Lundmark Gold Mines Ltd.....						
Ruth Mine.....						
Ptarmigan Mines Ltd.....						
BRITISH COLUMBIA						
Bayonne Cons. Mines Ltd.....	1-89	5-72	3-25	1-88	12-74	12-27
Bralorne Mines Ltd. (f).....	1-02	3-16	0-77	1-52	6-47	7-34
Buena Vista Mining Co. Ltd. (p).....	0-03	0-87	1-08	.....	1-98	2-28
Buccaneer Mines Ltd. (v).....	(h)	(h)	(h)	(h)	(h)	(h)
Cariboo Gold Quartz Mining Co. Ltd.....	1-51	6-94	1-62	0-84	10-91	9-351
Gold Belt Mining Co. Ltd.....	0-75	2-16	1-49	0-84	5-24	8-30
Hedley Mascot Gold Mines Ltd. (f).....	0-57	2-40	2-16	3-31	8-44	7-74
Island Mountain Mines Co. Ltd.....	2-88	4-38	2-23	2-25	11-74	9-37
Kootenay Belle Gold Mines Ltd. (q).....	0-18	4-03	1-46	2-08	7-75	11-69
Livingstone Mining Co. Ltd.....	.....	7-50	4-50 (r)	3-00	15-00	19-50
Musketeer Mines Ltd. (s).....	1-40	2-73	2-49	2-05	8-67	(h)
Mount Zeballos Gold Mines Ltd. (f) (t).....	2-02	4-22	3-01	4-50	13-75	13-52
Privateer Mine Ltd.....	3-23	3-45	1-48	5-35	13-51	19-17
Pioneer Gold Mines of B.C. Ltd.....	1-000	4-358	1-300	3-516	10-174	10-817
Sheep Creek Gold Mines Ltd.....	0-665	3-137	1-602	1-079	6-493	7-434
Spud Valley Gold Mines Ltd. (u) (f).....	0-584	5-687	2-369	2-881	11-421	12-91
Surf Inlet Cons. Gold Mines Ltd. (w).....	3-00	3-48	1-56	5-24	13-28	8-03

(a) Exclusive of outside exploration.

(b) Marketing, head office, taxes, etc.

(c) Depreciation not included.

(d) Exclusive taxes and head office.

(e) Closed down August 31.

(f) Produced bullion and also shipped ore or concentrates to smelter.

(g) Exclusive of taxes.

(h) Not available for publication.

(i) Milled at Broulan mine.

(j) Closed down May 31.

(k) Closed down April 30.

(l) Includes development.

(m) Closed down August 31.

(n) Closed down October 15.

(o) Closed down August 31.

(p) Closed down April 5.

(q) Milling ceased November 28.

(r) Smelting and cartage—all crude ore smelted.

(s) Closed down July 23.

(t) Closed down April 30.

(u) Closed down June 30.

(v) Closed down August 11.

(w) Shipped to smelter.

Table 48.—Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1928-1942

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter-refinery treatment on ores and bullion shipped per ounce of gold produced	Total of specified costs
	Ounces	\$	\$	\$	\$	\$
1928.....	206	1.47	7.45	Information not available	Information not available	
1929.....	218	1.46	7.18			
1930.....	237	1.25	6.63			
1931 (a).....	250	1.19	6.50	1928 to 1934	1928 to 1934	
1932.....	255	1.21	6.31			
1933 (b).....	207	1.36	7.45			
1934 (c).....	154	1.71	9.64			
1935.....	146	1.89	10.48	4.38		16.75
1936.....	137	1.98	11.32	4.46		17.76
1937.....	132	2.10	12.18	4.65	0.33 (d)	19.26
1938.....	150	1.85	10.95	4.53	0.56	17.89
1939.....	157	1.81	10.69	4.45	0.67	17.62
1940.....	161	1.76	10.48	4.40	0.69	17.42
1941.....	155	1.82	11.56	4.53	0.77	18.68
1942.....	176	1.84	11.47	4.34	0.75	18.40

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25.8 to 15 5/21 grains, 0.9 fine.

(d) Not including Mint charges and marketing prior to 1938.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as entirely reflecting "Cause and effect" in the operation of producing mines only but rather as indices of change in the industry as a whole. For data relating to producers only, see following Table.

Table 49.—Certain Data Relating to the Production of Gold by Producers Only in the Auriferous Quartz Mining Industry in Canada, 1931, 1939-1942

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter-refinery treatment of ores and bullion shipped per ounce of gold produced	Total of specified costs
	Ounces	\$	\$	\$	\$	\$
1931.....	256	1.19	6.38	(x)	(x)	
1939.....	164	1.76	10.25	4.33	0.67	17.01
1940.....	165	1.72	10.20	4.41	0.69	17.03
1941.....	158	1.79	11.37	4.46	0.77	18.39
1942.....	177	1.83	11.41	4.33	0.75	18.32

(x) Data not available.

Table 50.—Ores Mined and Treated by Auriferous Quartz Mining Industry, for Years Specified

Year	Ore hoisted	Ore milled (c)	Crude ore shipped to smelters (d)	Low grade sorted out	Tailings retreated	Gold recovered as bullion (b)	Gold in crude ore shipped	Gold in concentrates, slag, etc., shipped
	Tons	Tons	Tons	Tons	Tons	Fine oz.	Fine oz.	Fine oz.
1925.....	3,646,460	3,527,021	118,436†	(a)	48,475	1,482,294	97,011	34,131
1930.....	4,472,803	4,306,889	123,037	(a)	37,095	1,782,556	45,342	56,893
1935.....	8,832,901	8,888,129	19,481	(a)	57,798	2,492,145	9,846	143,666
1936.....	10,604,208	10,504,181	6,569	(a)	33,814	2,903,063	9,988	192,439
1937.....	12,388,489	11,880,323	39,642	457,622	97,710	3,263,795	17,757	188,618
1938.....	14,749,649	14,158,555	176,822	528,696	64,926	3,810,642	44,451	191,586
1939.....	17,105,744	16,150,173	275,519	690,578	18,426	4,160,352	56,044	167,448
1940.....	18,986,306	18,083,439	209,394	737,538	180,311	4,386,673	42,422	190,157
1941.....	20,031,736	19,026,273	210,396	936,003	480,289	4,405,986	49,602	190,738(d)
1942.....	17,722,866	16,820,442	282,334	658,439	5,176	3,898,999	39,512	193,068(d)

(a) Not available.

(b) Content of bullion shipped 1925-1935; 1936-41 content of bullion produced.

(†) In addition, a relatively small tonnage of unclassified ores was shipped.

(c) + (d) = total crude ore treated (not including sorted material).

(d) Gold in material shipped by gold mines to other gold mines for treatment is included under bullion.

Table 51.—Gold Content of Bullion, Ores, Concentrates, Etc., Shipped and Ore Milled by Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1942

Year	Tonnage treated (*)	Gold content fine oz. (†)	Oz. of fine gold per ton	Average price of gold
				\$
1929.....	4,371,143	1,771,526	41	20.67
1930.....	4,429,906	1,884,791	43	20.67
1931.....	5,526,379	2,271,278	41	21.55
1932.....	5,997,492	2,502,327	42	23.47
1933.....	6,480,164	2,455,365	38	28.60
1934.....	7,524,803	2,490,513	33	34.50
1935.....	8,907,610	2,645,659	30	35.19
1936.....	10,510,750	3,095,427	29	35.03
1937.....	11,919,965(a)	3,490,170	29	34.99
1938.....	14,335,377(a)	4,046,679	28	35.17
1939.....	16,425,692(a)	4,383,844	27	36.14
1940.....	18,292,833(a)	4,619,252	25	38.50
1941.....	19,236,669(a)	4,646,326	24	38.50
1942.....	17,102,776(a)	4,131,579	24	38.50

(*) Does not include tailings retreated, but includes ore milled plus crude ore shipped to smelters.

(†) Relatively small quantity of gold contained in concentrates, slag, etc., shipped and in cyanide solution in circuit may have originated in ores treated during the previous year; from 1937 represents metal content of total bullion produced plus metal in ores or concentrates shipped to smelters.

(a) Material discarded by sorting not included.

Table 52.—Milling Capacity of Producing Canadian Gold Mines, 1935-1942
(Tons of 2,000 pounds per 24 hours)

Year	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories
1935.....	292	3,368	20,921	1,465	.....	2,990	.....
1936.....	713	4,514	22,639	1,000	.....	4,120	.....
1937.....	565	6,090	25,249	975	30	3,915	.....
1938.....	542	8,217	30,067	875	1,000	4,590	.....
1939.....	562	9,580	33,324	865	1,000	4,417	.....
1940.....	450	11,215	35,030	690	1,200	4,255	275
1941.....	319	12,654	37,416	990	1,355	4,510	510
1942.....	247	14,330	36,135	903	1,202	4,303	710

Table 53.—Principal Statistics Relative to All Ontario Gold Mines by Areas (*)
1941-1942

Camp or district	Number of producers	Ore (†) treated	Total gold recovered	Average ounces per ton recovered	Employees	Salaries and wages paid	Cost of fuel, electricity and process supplies
1941		Tons	Fine oz.		No.	\$	\$
Porcupine.....	21	5,974,447	1,439,148	24	9,746	19,230,445	8,110,392
Kirkland Lake.....	12	(b) 1,900,481	743,123	39	4,359	8,253,004	3,836,956
Larder Lake.....	4	1,124,221	205,766	18	1,135	2,347,675	1,218,731
Matachewan.....	2	543,677	58,683	11	521	999,239	662,812
Sudbury.....	4	148,119	23,420	15	468	913,103	324,611
Algoma.....	3	89,432	11,565	13	166	291,953	143,423
Thunder Bay.....	16	(a) 823,954	243,321	29	1,883	3,611,904	1,930,980
Rainy River and Kenora.....	7	53,450	18,162	34	231	381,904	157,196
Patricia.....	13	1,569,616	372,727	24	2,490	4,799,957	2,797,612
Eastern Ontario.....	1	300	60	20	8	5,052	3,400
Total.....	83	12,227,706	3,115,975	25	21,007	40,834,236	19,186,113
1942							
Porcupine.....	20	5,624,554	1,308,291	23	8,499	18,209,637	7,501,441
Kirkland Lake.....	10	1,309,361	543,284	41	2,946	6,028,485	2,812,489
Larder Lake.....	4	1,166,209	214,751	18	1,057	2,119,060	1,033,205
Matachewan.....	2	611,982	59,085	10	392	810,796	621,333
Sudbury.....	2	200,011	33,414	17	339	687,691	269,285
Algoma.....	3	52,125	8,804	16	98	197,850	94,898
Thunder Bay.....	10	662,816	218,430	24	1,366	3,061,671	1,790,286
Rainy River and Kenora.....	5	36,449	12,039	25	125	243,690	93,348
Patricia.....	11	987,697	294,103	23	1,754	3,721,469	1,760,838
Eastern Ontario.....	.....	.....	.....	.....	.....	.....	.....
Total.....	67	10,651,204	2,692,201	24	16,576	35,079,849	15,977,123

(a) In addition, 588 tons tailings were treated.

(b) In addition, 5,176 tons tailings were retreated in 1942, and 407,823 tons in 1941.

(*) Includes data for all active properties.

(†) Does not include low-grade discarded by sorting, but includes ore milled or smelted.

Table 54.—Capital Employed in the Auriferous Quartz Gold Mining Industry in Canada, 1942

Province	Mines		Capital employed as represented by:					
			Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	Total
	Operating	Producing						
	Number	Number						
Nova Scotia.....	6	4	7,495	267,706	25,105	4,300	13,832	318,438
Quebec.....	50	29	9,438,977	14,618,240	3,427,277	919,441	9,975,235	38,379,170
Ontario.....	75	67	33,125,446	78,541,332	11,097,094	5,261,039	47,264,334	175,289,245
Manitoba.....	8	7	1,871,314	2,285,095	585,014	54,000	1,215,862	6,011,285
Saskatchewan.....	3	3	-	15,000	2,000	-	100	17,100
British Columbia.....	78	67	1,854,963	5,506,781	1,536,001	639,194	8,364,671	17,901,610
Yukon.....								
Northwest Territories (a).....	7	7	4,586,965	1,602,479	651,113	100,665	322,927	7,324,149
Total.....	227	184	50,885,160	102,836,633	17,323,604	7,038,639	67,156,961	245,240,997

(a) Capital of one producing mine included with non-ferrous smelting industries in British Columbia.

Table 55.—Employees, Salaries and Wages in the Auriferous Quartz Mining Industry in Canada, by Provinces, 1942

Province	Number of employees					Salaries and wages
	On salary	Wage-earners			Total employees	
		Surface	Under-ground	Mill		
Nova Scotia.....	12	22	62	8	104	\$ 158,602
Quebec.....	608	1,211	3,425	492	5,736	11,381,876
Ontario.....	1,318	(b) 3,811	10,206	1,241	16,576	35,079,849
Manitoba.....	70	193	189	31	483	1,060,211
Saskatchewan.....	32	25	40	16	113	231,088
British Columbia (a).....	377	469	1,336	257	2,439	5,058,944
Northwest Territories.....	96	203	221	59	579	1,418,302
Yukon.....						
Canada.....	2,513	5,934	15,479	2,104	26,030	54,388,872

(a) In B.C. there are included with mill employees 19 men working in a mill underground. This was the only underground mill reported in Canada and closed in 1942.

(b) Includes 61 females; corresponding data for other provinces not available.

Table 56.—Wage-Earners, by Months, in the Entire Auriferous Quartz Mining Industry, 1931, 1939, 1941 and 1942

Month	1931	1939	1941	1942				Total
	Total	Total	Total	Surface		Under-ground	Mill	
				Male	Female	Male	Male	
January.....	8,273	27,402	29,772	6,600	39	17,858	2,233	26,730
February.....	8,482	27,278	29,765	6,507	52	18,014	2,239	26,812
March.....	8,681	26,941	29,783	6,385	49	17,793	2,224	26,451
April.....	8,746	26,767	29,633	6,303	50	17,536	2,266	26,155
May.....	9,030	27,669	29,869	6,182	57	16,842	2,244	25,325
June.....	9,319	28,238	29,807	6,177	54	16,467	2,240	24,938
July.....	9,345	28,537	30,310	6,039	79	15,369	2,200	23,687
August.....	9,285	28,743	30,158	5,676	75	14,043	2,089	21,883
September.....	9,391	28,577	30,605	5,443	65	13,754	1,984	21,246
October.....	9,524	28,621	30,870	5,210	66	12,827	1,921	20,024
November.....	9,496	28,402	29,567	5,018	66	12,694	1,914	19,692
December.....	9,323	27,516	27,566	4,800	71	12,435	1,886	19,192

THE COPPER-GOLD-SILVER MINING INDUSTRY, 1942

The mining of "copper-gold-silver" ores in Canada during 1942 was confined to the provinces of Quebec, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large and increasing quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario, increasing quantities of gold and silver are also being extracted from these copper-nickel ores. General statistics relating to labour, etc., in the nickel-copper industry are not included in this report.

The mining of copper-gold-silver ores, particularly in Western Canada, was adversely affected in 1942 by a shortage of skilled labour resulting largely from the enlistment of personnel in the armed forces.

Mining operations conducted on Canadian copper-gold-silver deposits during 1942 were reported by 26 firms compared with 21 in 1941. The gross value of crude ore, concentrates, etc., shipped in 1942 from the mines and mills to smelters was estimated at \$69,147,790; the cost of fuel, purchased electricity, process supplies, freight and smelter treatment totalled \$35,459,148 and the net value of shipments was estimated at \$33,688,642.

The gross value of ores shipped by firms which both mine and smelt their own ores is often not reported. This necessitates considerable estimating in determining gross and net values for mine shipments. However, errors or possible incongruities resulting from this are largely compensated for in determining the value added at the smelters and refineries. This added value is credited to the non-ferrous smelting and refining industry and is also included in the total net value of production of the entire Canadian mining industry. This fact should be noted in making any statistical study of the annual production values shown for shipments from copper-gold-silver mines.

The statistics as herein shown under the copper-gold-silver mining industry refer only to mines and mills and are not inclusive of data pertaining to the operation of smelters and refineries. Statistics relating to the reduction of non-ferrous ores are recorded under the non-ferrous smelting and refining industry.

Quebec.—Noranda Mines Ltd. reported that production at the Horne mine in 1942 was at full capacity as permitted by sound and safe mining practice and limitations of the capacity of the smelter and of the customs refinery operated by its subsidiary, Canadian Copper Refiners Limited. The estimated copper and gold content of the ore indicated above the 2,975 foot level, as of January 1, 1943, is sufficient to maintain production of those metals for fifteen years at the 1942 rate of production.

Waite Amulet Mines Ltd., in its annual report, stated that the concentrator has, for the second time, been increased by adding another 300-ton extension. This last increase became effective on February 1, 1943, raising the capacity of the concentrator to 1,800 tons per day. This additional capacity will be utilized principally for the production of zinc concentrate for shipment to smelters in the United States. Currently, approximately 1,200 tons of ore are being extracted from the Amulet Dufault lower "A" orebody owned by the company's subsidiary, Amulet Dufault Mines Ltd., 300 tons from the Waite mine and 300 tons from the "C" orebody in the Amulet section. Surface drilling at the Waite mine exhausted all known favourable possibilities of finding more ore in the immediate vicinity of the open pit and of the known orebodies. Further drilling will be necessary to trace the downward extension of the mineralized zone on the 12th level. Exploratory drilling of the "C" orebody was started underground in August to determine the limits of the ore for mining purposes. An estimated 15,000 tons of copper, high zinc ore was added to the ore reserves. There are indications that the "C" orebody will give an increased tonnage of zinc-bearing ore. In the Amulet Dufault section all of the 6,000 feet of exploratory diamond drilling completed during the year was used to check on irregularities in the Lower "A" orebody contact. A total of 212,038 tons was added to the Lower "A" orebody reserves. Two new stopes were brought into production during the year. One stope will supply high copper, low zinc ore and the other will supply low copper, high zinc ore.

Normetal Mining Corporation Limited, in its 1942 annual report, stated that the plant extension, on which construction was started in 1941, was put in operation, and as a result tonnage treated was the highest in the mine's history. The total production of copper and zinc concentrates was shipped, the copper to Noranda smelter, the zinc to smelters in the United States. Of the total tonnage of ore broken, 23.5 per cent was supplied by development and stope preparatory work, 37.5 per cent by sub-level stopes, and 39 per cent by fill stopes. Although no new levels were opened up during the year, ore reserves calculated to the 2,000-foot level declined by only 10 per cent as compared with the reserve at the end of 1941. Ore added during the year included that developed on levels partially opened up previously, zinc ore in No. 3 orebody now considered as mineable, and overbreak beyond previously estimated limits. The average grade of copper in the total reserve was substantially the same as that of the previous year, while grade of zinc increased by approximately 30 per cent. Operating cost at \$4.90 per ton milled was 78 cents per ton higher than in 1941. A shortage of men prevailed throughout the year, to an extent to interfere with required development work, and at times was even responsible for a reduction in output.

Aldermac Copper Corp. Ltd., operated continuously throughout 1942. Copper concentrates were shipped to the Noranda smelter while the greater part of the iron pyrites output was exported to the United States. It was reported early in 1943 that ore reserves were very limited and that the company was now interested in the exploration and development of a recently discovered copper-bearing deposit located near Lennoxville in the south-eastern part of the province.

Manitoba and Saskatchewan.—The Hudson Bay Mining and Smelting Co. Ltd. reported that all the ore milled during 1942 was hoisted from underground, 56 per cent coming through the north main shaft, and 44 per cent through the south main shaft. Production of copper, zinc, gold and silver was the highest on record for any year. The tonnage of ore mined and hoisted from underground was the largest on record. Work in the open pit was confined to the mining of former railroad berms or benches and floor pillars. The year's production of slab zinc was an all-time high. The capacity of the copper smelter was further increased during the year. Contracts for the sale of copper and zinc, at substantially pre-war prices, entered into originally in 1939 with the British Ministry of Supply, were extended without change for another year and a similar arrangement arrived at with the Canadian Government. Emergency Metals Limited, a wholly owned subsidiary, was formed to mine and mill, as a war measure, the remaining portion of an ore body developed through the old Mandy shaft, located approximately four miles southeast of the company's main operations and metallurgical plants. The average number of employees at Flin Flon during 1942 was 2,069; the labour shortage during part of the year was such that underground development work had to be drastically cut down; women are now being employed on various types of work in the metallurgical and other surface plants and over 200 farmers worked for the company during the winter.

Sherritt-Gordon Mines, Limited, reported that although the tonnage treated in the mill during 1942 constituted a record, the output of copper was slightly below that of the preceding year, due to lower grade of mill feed. Costs per ton of ore milled (\$2.347 cost of concentrate at Sherridon) were practically the same as in the previous year but costs per pound of copper produced showed an increase, for the reason given above (5.750 cents per pound in concentrate—Sherridon). Production from the East mine was resumed in the spring and continued on an increased scale throughout the year, by which time a substantial proportion of the entire output was coming from this zinc reserve. Little new ore was found during the year, but in various parts of the mine stopes yielded considerably greater tonnage than was expected. Copper concentrates continued to be smelted at Flin Flon and zinc concentrates were shipped to the Metals Reserve Company in United States. In October the National Selective Service started sending in Saskatchewan farmers for winter work.

British Columbia.—At Mt. Sicker, in the Chemainus district of the Victoria Mining Division, development work was conducted on a copper-zinc bearing deposit by Twin "J" Mines Limited, a subsidiary of Jason Mines Limited. Operations included diamond drilling and construction of a mill.

Britannia Mining & Smelting Company Limited carried on mining and milling operations at Britannia Beach throughout the entire year. Copper concentrates were exported to the United States and iron pyrites shipments went to both Canadian and United States firms. The company reported that a reduction of approximately 50 per cent in the scale of operations became necessary due to an acute labour shortage. Late in 1942, in cooperation with the Dominion Employment Service, a considerable number of men were obtained, making possible a slight increase in production. To meet the situation a contract was arranged with Wartime Metals Corporation, a company wholly owned by the Canadian Government, under the terms of which all Britannia products are sold for their account and the company guaranteed against loss and allowed a small profit. Exploratory work below the main haulage adit continued to produce encouraging results.

At Copper Mountain the mill and mine of the Granby Consolidated Mining, Smelting & Power Company Ltd. were operated throughout the year. Copper concentrates were shipped to Tacoma, Wash., for smelting. Labour shortages were experienced and it was reported that the company completed an agreement with the Canadian Government to co-operate in increasing production.

Operations conducted at Anyox in 1942 by Anyox Metals Ltd., consisted solely of diamond drilling, experimental work and camp rehabilitation. The camp was completely razed by fire on July 1.

Table 57.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1942 (a)

Province	Mines		Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	Total
	Operating	Producing						
			\$	\$	\$	\$	\$	\$
Quebec.....	14	6	15,927,515	10,228,433	948,573	1,809,510	10,435,581	39,349,612
Ontario.....	3		27,925	9,800			464	38,180
Manitoba.....	4	2	1,405,409	3,205,578	637,859	976,525	4,372,438	10,617,809
Saskatchewan.....	(b) 1	(b) 1	5,621,236	6,504,335	1,356,596	108,851	13,202,894	26,793,912
British Columbia*	6	4	290,855	2,852,365	1,064,632	440,494	3,328,375	7,976,721
Total.....	28	13	23,272,940	22,800,511	4,027,660	3,335,380	31,339,752	84,776,243

* Reports from small leasers shipping from deposits of the Consolidated Mining and Smelting Company of Canada, Ltd., in the Rossland district, are compiled as one producer; statistics relating to employment, etc., at these properties are not available.

(a) Not including smelters and refineries.

(b) 1 firm is also included in Manitoba.

Table 58.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, by Provinces, 1942*

Province	Number of employees					Salaries and wages
	On salary	Wage-earners			Total employees	
		Surface	Under-ground	Mill		
						\$
Quebec.....	113	512	1,126	250	2,001	3,686,099
Ontario.....	4	4			8	7,139
Manitoba.....	93	282	460	79	914	1,904,458
Saskatchewan.....	216	449	501	142	1,308	2,683,942
British Columbia.....	204	366	589	256	1,415	2,815,774
Canada.....	630	1,613	2,676	727	5,646	11,097,412

* Not including smelters and refineries.

Table 59.—Wage-Earners, by Months, in the Copper-Gold-Silver Mining Industry in Canada, 1942*

Month	Surface	Under-ground	Mill	Total
January.....	1,607	2,989	724	5,320
February.....	1,600	2,923	745	5,268
March.....	1,543	2,784	731	5,058
April.....	1,580	2,651	726	4,957
May.....	1,588	2,572	735	4,895
June.....	1,668	2,555	723	4,946
July.....	1,614	2,574	729	4,917
August.....	1,578	2,433	734	4,745
September.....	1,572	2,419	698	4,689
October.....	1,632	2,528	710	4,870
November.....	1,665	2,792	712	5,169
December.....	1,666	2,890	754	5,310
Average.....	1,613	2,676	727	5,016

* Smelter employees not included.

Table 60.—Dividends Paid by Specified Copper-Gold-Silver Mining Companies

Company	Dividend 1942	Total Dividends Paid to end of 1942
	\$	\$
QUEBEC—		
Aldermac Copper Corporation Ltd.....	46,220	46,220
Lake Dufault Mines Ltd.....	8,959,088	80,295,836
Noranda Mines Ltd.....		
Normetal Mining Corporation Ltd.....	1,320,000	2,970,000
Waite Amulet Mines Ltd. (Waite Mine).....	1,408,000	2,464,000
Waite Amulet Mines Ltd. (Amulet Dufault Mines Ltd.).....		
MANITOBA—		
Emergency Metals Ltd.....	5,515,946	35,853,649
Hudson Bay Mining and Smelting Co. Ltd.†.....	587,443	1,762,330
Sherritt-Gordon Mines Ltd.....		
BRITISH COLUMBIA—		
Britannia Mining and Smelting Co. Ltd.....	266,701	11,327,516
The Granby Consolidated Mining, Smelting and Power Co. Ltd.....	315,163	11,465,005
Twin "J" Mines Ltd.....		

†Manitoba-Saskatchewan boundary passes through property.

Table 61.—Specified Data Relating to the Copper-Gold-Silver Mining Industry, 1929-1942*

Year	Wage-earners	Wages paid	Salaried employees	Salaries paid	Total salaries and wages
	No.	\$	No.	\$	\$
PRODUCING MINES—					
1929.....	3,036	5,465,871	174	462,268	5,928,139
1930.....	4,634	7,394,741	185	536,482	7,931,223
1931.....	2,901	4,140,890	160	465,603	4,606,493
1932.....	2,900	3,392,322	131	328,079	3,720,401
1933.....	2,590	3,550,417	123	275,650	3,826,067
1934.....	2,878	4,357,517	168	419,127	4,776,644
1935.....	2,946	4,144,095	207	473,988	4,618,083
1936.....	3,328	4,608,774	308	708,200	5,316,974
1937.....	4,618	7,019,595	436	1,058,082	8,077,677
1938.....	5,051	7,694,141	418	1,075,014	8,769,155
1939.....	5,401	8,498,360	470	1,126,561	9,624,921
1940.....	5,605	9,434,060	479	1,313,509	10,747,569
1941.....	5,324	9,249,883	524	1,428,993	10,678,856
1942.....	4,957	9,455,565	616	1,529,893	10,985,458
Total.....		88,406,211		11,195,449	99,601,660
NON-PRODUCING MINES—					
1929.....	1,777	2,132,279	256	438,337	2,570,616
1930.....	775	1,037,743	90	187,793	1,225,536
1931.....	224	256,204	66	95,620	351,824
1932.....	33	27,439	12	22,787	50,226
1933.....	92	81,998	36	30,713	112,711
1934.....	87	65,485	36	33,672	99,157
1935.....	248	367,685	29	54,428	422,113
1936.....	84	119,084	18	37,267	156,351
1937.....	84	126,155	26	36,782	162,937
1938.....	93	129,246	15	23,064	152,310
1939.....	186	256,999	26	38,671	295,670
1940.....	18	18,746	13	11,512	30,258
1941.....	12	10,449	6	5,718	16,167
1942.....	59	94,021	14	17,933	111,954
Total.....		4,723,533		1,034,297	5,757,830

(*) Not including smelters or refineries.

Table 62.—Specified Data Relating to the Copper-Gold-Silver Mining Industry, 1929-1942 (†)

Year	Producing Mines					Non-producing mines			
	Electricity purchased	Total fuel and power used	Hydraulic turbines used	Process supplies used	Freight on ore, etc. shipped	Smelter treatment charges (x)	Electricity purchased	Total fuel and power used	Hydraulic turbines used
	k.w.h.	\$	h.p.	\$	\$	\$	k.w.h.	\$	h.p.
1929.....	91,622,530	785,395	9,300	(a)	(a)	(a)	3,155,653	249,738	1,275
1930.....	124,395,046	1,179,447	9,300	(a)	(a)	(a)	731,964	98,815	690
1931.....	225,088,928	709,614	9,300	(a)	(a)	(a)	311,800	16,888	1,159
1932.....	127,331,868	446,736	9,300	(a)	(a)	(a)	1,584,700	16,727	609
1933.....	68,188,303	387,312	9,300	(a)	(a)	(a)	453,000	17,313	609
1934.....	90,097,659	526,941	9,300	(a)	(a)	(a)	1,108,500	15,729	.....
1935.....	91,828,181	520,724	9,300	2,892,443	(a)	(a)	1,108,500	13,428	.....
1936.....	71,134,263	441,132	9,300	3,127,527	(a)	(a)	2,253,803	54,711	.....
1937.....	199,045,597	871,002	9,300	4,808,504	344,818	9,735,199	.....	30,086	.....
1938.....	214,930,438	1,049,325	9,300	4,746,830	960,791	13,639,953	5,501,100	50,959	609
1939.....	247,180,650	1,203,878	8,900	5,539,545	1,582,350	16,587,402	2,119,520	19,645	1,250
1940.....	270,601,445	1,297,454	8,900	5,812,178	882,633	17,378,092	.....	.....	.....
1941.....	251,488,789	1,264,533	10,520	5,504,530	1,873,728	25,994,492	.....	34	.....
1942.....	259,238,497	1,334,353	19,150	5,690,431	1,932,958	28,401,998	108,000	4,384	.....
Total.....	2,332,172,194	12,011,846	.....	38,121,988	7,577,278	111,707,136	18,436,540	588,457	236,061

(a) Not available.

(x) Partly conjectural.

(†) Non including smelters or refineries.

Table 63.—Shipments from Copper-Gold-Silver Mines in Canada, 1941 and 1942

—	Quantity	Value	Total metal content without any deductions				
			Gold	Silver	Copper	Sulphur	Zinc
	tons	\$	fine oz.	fine oz.	pounds	tons	pounds
1941							
11 mines shipped to Canadian plants (a)—							
Ores.....	865,921	8,451,805	150,647	320,904	22,516,954		
Copper concentrates.....	828,622	36,246,634	296,302	4,282,053	240,003,806		3,138,594
Zinc concentrates.....	135,582	3,611,904	6,263	212,115	1,246,645		125,006,638
Iron pyrites concentrates.....	94,818	184,020					
Slag, residues and gold precipitates.....	189	1,158,147	28,893	113,299	162,553	45,440	
10 mines shipped to foreign plants—							
Ores.....	21	234	5	72	865		
Copper concentrates (†).....	145,549	9,564,563	49,802	430,563	68,313,890		
Zinc concentrates.....	51,983	4,515,184	471	47,051	397,450		57,515,573
Iron pyrites concentrates.....	208,542	1,096,582				103,762	
Total.....	2,331,227	64,839,073	(c) 541,353	5,406,147	332,642,163	149,208	185,729,142
Value of process supplies, etc. (b)		34,608,742					
Net Value.....		30,230,331					
1942							
12 mines shipped to Canadian plants (a)—							
Ores.....	760,973	8,771,329	146,412	318,805	23,927,383		
Copper concentrates.....	816,793	38,161,711	342,995	4,700,629	234,276,699		
Zinc concentrates.....	172,519	4,613,158	11,424	293,259	1,409,339		159,543,348
Iron pyrites concentrates.....	69,014	132,063					
Slag, residues, bullion, and gold precipitates.....	193	1,440,349	35,146	227,776	129,659	32,580	
8 mines shipped to foreign plants—							
Ores.....							
Copper concentrates (†).....	101,752	7,273,864	19,892	283,596	50,619,295		
Zinc concentrates.....	92,135	7,453,208					94,931,813
Iron pyrites concentrates.....	310,479	1,302,108				150,199	
Total.....	2,323,858	69,147,790	(c) 555,869	5,824,065	315,362,425	182,779	254,475,165
Value of process supplies, etc. (b)		35,459,148					
Net Value.....		33,688,642					

(†) Includes some copper precipitate.

(a) Certain mines operated in the Rossland area by leasers in 1941 and 1942 treated, statistically, as one mine.

(b) Includes freight on ore shipments, smelter charges and fuel and purchased electricity.

(c) Gross value.

NOTE.—The value of ores and concentrates shipped from mines to smelters operated by the same companies are often of a nominal or conjectural nature.

Table 64.—Ores Mined, Milled, and Concentrates Produced by the Copper-Gold-Silver Mining Industry, 1929-1942

Year	Ore mined	Ore milled	Copper concentrates produced (†)	Zinc concentrates produced	Iron pyrites concentrates produced	Net value of all mine shipments
	tons	tons	tons	tons	tons	\$ (c)
1929.....	5,134,824	4,512,806	262,941		76,581	21,859,907(a)
1930.....	5,768,664	4,926,431	298,085	72,112	53,453	15,629,564(a)
1931.....	6,002,865	5,243,382	469,059	63,828	63,293	15,951,103(a)
1932.....	5,453,173	4,607,659	518,609	76,507	71,945	11,143,759(a)
1933.....	5,448,690	4,521,301	521,399	88,465	59,354	7,707,270(a)
1934.....	6,065,692	5,127,189	587,045	81,811	80,684	8,265,071(a)
1935.....	5,650,665	4,693,387	614,942	96,466	66,700	16,676,447(a)
1936.....	5,052,222	4,091,570	503,650	101,303	105,669	19,271,965(a)
1937.....	6,749,809	5,802,031	630,664	116,698	201,494	30,655,784(b)
1938.....	7,929,434	6,961,188	756,065	123,687	173,444	34,739,439(b)
1939.....	8,474,855	7,790,725	828,963	105,842	161,238	32,991,716(b)(c)
1940.....	8,931,291	8,325,979	930,622	126,346	172,500	34,914,051(b)
1941.....	9,263,071	8,402,656	974,250	187,622	309,050	36,990,853(b)
1942.....	8,575,626	7,816,813	(d) 858,590	264,739	219,874	40,730,834(b)
TOTAL—14 years.....	94,500,881	82,793,117	8,754,874	1,505,806	1,815,279	327,527,763

(a) Value f.o.b. mine and presumed gross value less freight and treatment charges which were not reported separately by operators prior to 1937.

(b) Gross value reported by operators less only freight and treatment costs deducted by D.B.S.

(c) Subject to revision.

(†) Includes a relatively small quantity of copper precipitates.

(d) In addition 15,554,164 tons of tailings were retreated.

NOTE.—Values for shipments made to smelters operated by the same company are often not available or nominal in nature, resulting in annual variations in the distribution of production values between the mining industry proper and the non-ferrous smelting and refining industry. This explains, to a considerable extent, such apparent incongruities as the value data for 1938-39.

Table 65.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, by Provinces, 1942

	Manitoba and Saskat- chewan	Quebec	British Columbia	Canada
	tons	tons	tons	tons
Ore mined.....	2,944,296	2,961,665	2,669,665	8,575,626
Ore milled.....	(a) 2,940,454	2,208,056	2,668,303	7,816,813
Copper concentrates produced.....	468,364	348,021	41,530	857,915
Copper precipitates produced.....			665	665
Pyrites concentrates produced.....		188,373	31,501	219,874
Zinc concentrates produced.....	188,347	76,392	—	264,739

(a) In addition 1,554,164 tons of tailings were retreated at the Flin Flon mine.

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores; this is smelted in the production of blister or anode copper; also the Manitoba-Saskatchewan boundary passes through the Flin Flon mine.

Table 66.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1940

	Tons net	Content (†)				
		Gold fine oz.	Silver fine oz.	Copper pounds	Zinc pounds	Sulphur tons
To CANADIAN SMELTERS						
1929—						
Copper ore.....	570,791	67,008	432,951	57,063,264		
Copper concentrates (*).....	117,744	9,914	227,113	35,814,481		
Zinc concentrates.....						
Pyrites.....						
1930—						
Copper ore.....	724,966	109,043	437,034	70,487,335	1,748,920	
Copper concentrates.....	172,772	39,583	659,875	46,921,698		
Zinc concentrates.....	20,800	2,870	52,950	767,000	13,478,000	
Pyrites.....						
1931—						
Copper ore.....	1,726,712	309,765	1,522,200	96,789,533	47,835,966	
Copper concentrates.....	177,211	54,337	475,920	62,557,732		
Zinc concentrates.....	63,828	5,808	126,379	1,928,000	35,056,199	
Pyrites.....						
1932—						
Copper ore.....	850,451	314,784	564,983	51,905,334		
Copper concentrates.....	451,063	117,783	1,288,300	110,256,022		
Zinc concentrates.....	76,507	7,535	157,843	2,181,377	68,258,142	
Pyrites.....	3,465					598
Precipitate.....	54	11,573	98,302	55,174		
1933—						
Copper ore.....	867,789	223,494	328,918	39,561,914		
Copper concentrates.....	495,305	156,924	1,463,446	107,886,584		
Zinc concentrates.....	80,780				55,938,867	
Pyrites.....						
Precipitate.....	65	15,030	155,941	65,873		
1934—						
Copper ore.....	868,467	162,797	282,391	33,173,070		
Copper concentrates.....	553,515	194,664	1,918,638	120,185,486		
Zinc concentrates.....	76,149	5,417	144,559	1,324,297	69,331,636	
Pyrites.....	1,199					593
1935—						
Copper ore.....	900,761	184,410	306,978	33,243,785		
Copper concentrates.....	573,206	203,509	1,753,871	123,750,525		
Zinc concentrates.....	93,195	6,482	168,298	1,591,969	84,283,903	
Pyrites.....	1,149					580
Precipitate.....	101	12,505	135,985	76,644		
1936—						
Copper ore.....	965,370	247,293	354,006	32,678,904		
Copper concentrates.....	458,065	215,183	1,586,085	85,709,434	27,715,850	
Zinc concentrates.....	100,615	6,017	176,085	1,465,980	91,008,760	
Pyrites.....	35,435					17,796
Precipitate.....	66	13,583	132,154	52,534		

Table 66.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1941—Continued

		Content (†)				
		Gold	Silver	Copper	Zinc	Sulphur
	Tons net	fine oz.	fine oz.	pounds	pounds	tons
To CANADIAN SMELTERS—Concluded						
1927—						
Copper ore.....	943,790	165,052	388,414	47,632,125		
Copper concentrates.....	528,641	236,566	2,090,353	119,755,349		
Zinc concentrates.....	106,074	8,135	184,248	1,593,711	95,941,609	
Pyrites.....	1,037					523
Slag, precipitate, etc.....	151	31,432	130,441	112,565		
1928—						
Copper ore.....	924,236	167,179	470,745	55,558,860		
Copper concentrates.....	606,255	271,099	2,565,893	138,288,971	1,668,410	
Zinc concentrates.....	94,994	8,199	175,391	1,446,591	85,882,822	
Pyrites.....	2,088					1,011
Slag, precipitate, etc.....	234	23,916	129,478	202,519		
1929—						
Copper ore.....	868,328	173,019	440,393	60,333,576		
Copper concentrates.....	616,071	237,742	2,637,965	145,937,499	1,683,442	
Zinc concentrates.....	96,817	7,378	182,517	1,320,610	91,116,593	
Pyrites.....	2,439					1,216
Slag, precipitate, etc.....	595	24,140	133,330	557,781		
1930—						
Copper ore.....	860,237	156,857	372,408	35,648,576		
Copper concentrates.....	768,833	258,692	3,514,614	208,421,117	2,492,666	
Zinc concentrates.....	108,328	5,250	185,406	954,803	102,169,600	
Pyrites.....	36,308					17,619
Slag, precipitate, etc.....	566	23,739	120,970	530,712		
1931—						
Copper ore.....	865,921	159,647	320,994	22,516,954		
Copper concentrates.....	828,622	296,302	4,282,053	240,003,806	3,138,594	
Zinc concentrates.....	135,582	6,263	212,115	1,246,645	125,006,638	
Pyrites.....	94,818					45,446
Slag, precipitate, etc.....	189	28,893	113,299	162,553	68,337	
Total for 13 years.....		4,986,811	33,602,292	2,199,715,272	1,003,824,954	85,382
To FOREIGN SMELTERS						
1929—						
Copper ore.....	3,352	192	5,876	333,719		
Copper concentrates (*).....	145,197	20,054	380,834	69,554,222		
Zinc concentrates.....						
Pyrites.....	76,581					38,203
1930—						
Copper ore.....	391	31	456	26,023		
Copper concentrates.....	126,250	16,877	335,134	65,656,756		
Zinc concentrates.....	11,082				11,527,280	
Pyrites.....	53,453					27,682
1931—						
Copper ore.....	55	58	150	5,345		
Copper concentrates.....	71,015	5,396	164,957	35,012,918		
Zinc concentrates.....						
Pyrites.....	63,293					31,771
1932—						
Copper ore.....	54	157	28			
Copper concentrates.....	37,558	8,868	87,346	18,625,044		
Zinc concentrates.....						
Pyrites.....	48,584					24,231
1933—						
Copper ore.....	120	132	193	11,578		
Copper concentrates.....	28,641	12,933	65,969	14,654,498		
Zinc concentrates.....	8,929				9,374,675	
Pyrites.....	58,604					28,178
1934—						
Copper ore.....	31,866	11,261	79,358	15,348,073		
Copper concentrates.....	5,899				5,374,023	
Zinc concentrates.....	35,957	2,889		84,697		4,908
Pyrites.....						
1935—						
Copper ore.....	62,356	13,826	86,864	19,410,963		
Copper concentrates.....	3,191	49,696			3,606,436	
Zinc concentrates.....						
Pyrites.....	28,056					13,942

Table 66.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1941—Concluded

	Tons	Content (†)				
		Gold	Silver	Copper	Zinc	Sulphur
	net	fine oz.	fine oz.	pounds	pounds	tons
To FOREIGN SMELTERS—Concluded						
1936—					727,398	
Copper ore.....	645					
Copper concentrates.....	53,114	13,039	100,192	23,514,161		
Zinc concentrates.....						45,374
Pyrites.....	91,777					
Slag, etc.....	5,004	169	7,345	450,133		
1937—						
Copper ore.....	131	43	164	13,222		
Copper concentrates.....	97,553	15,120	266,874	48,759,159		
Zinc concentrates.....	5,871				6,041,690	
Pyrites.....	118,420					59,657
1938—						
Copper ore.....	850	479	3,191	80,245		
Copper concentrates.....	152,955	23,759	476,207	79,978,954		
Zinc concentrates.....	5,966	103	12,577	133,526	6,270,471	
Pyrites.....	42,515					21,316
1939—						
Copper ore.....	108	101	55	5,425		
Copper concentrates.....	177,884	53,866	543,600	84,062,126		
Zinc concentrates.....	30,693			203,969	33,669,569	
Pyrites.....	225,200					113,231
1940—						
Copper ore.....	11	11	949	2,234		
Copper concentrates.....	159,316	39,952	492,352	78,778,442		
Zinc concentrates.....	30,389	456	45,552	444,808	32,558,961	
Pyrites.....	91,457					45,502
1941—						
Copper ore.....	21	5	72	865		
Copper concentrates and precipitates..	145,549	49,802	430,563	68,313,890		
Zinc concentrates.....	51,983	471	47,051	397,450	57,515,573	
Pyrites.....	208,542					103,762
Total for 13 years.....		339,746	3,633,909	623,862,445	166,666,076	557,757

(†) As determined by settlement assay and not necessarily all recovered.

(*) Includes a relatively small quantity copper precipitate for some years.

CHAPTER THREE

THE SILVER MINING INDUSTRY IN CANADA

(a) The Silver-Cobalt Mining Industry; (b) the Silver-Lead-Zinc Mining Industry.

Definition of the Industry.—Silver Mining in Canada is not a distinct mining industry in as much as silver or silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with cobalt, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear Lake, Northwest Territories with pitchblende. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. In Eastern Canada, ores containing lead and zinc have been mined in Ontario, Quebec and Nova Scotia.

It is to be noted that, in addition to its recovery from silver-lead ores, zinc is now produced in large quantities from the copper-gold-silver ores of the Flin Flon and Sherritt-Gordon mines located on or near the Manitoba-Saskatchewan boundary. Zinc concentrates have been produced in British Columbia from copper-gold-silver ores by the Britannia Mining and Smelting Co. Ltd.; the metal also occurs with copper-gold-silver ores in Quebec and commercial shipments of zinc concentrates made from these particular ores have been made yearly since 1937.

Statistical data contained in this chapter are essentially those pertaining to the mining of silver-cobalt and silver-lead-zinc ores and, to a lesser extent, silver-pitchblende ores.

(a) The Silver-Cobalt Mining Industry

The mining of silver-cobalt ores in Canada has been confined almost entirely to the district of Temiskaming in Northern Ontario. Veins containing these metals were discovered at or near the present town of Cobalt in 1903 and shipments of ores from this area have been continuous since 1904. Depletion and exhaustion of ore reserves during recent years have resulted in a relatively great decline in the production of metals from these deposits. In most instances, operations at properties, some of which were prominent as producers in the past, were conducted during recent years by lessees and shipments ranged from one to several hundred tons. The increased demand for cobalt as an alloying metal has, for some years, stimulated operations of a salvage nature at several of the older mines.

The gross value of shipments made by silver-cobalt mines in 1942 totalled \$750,250 and the net value of same was estimated at \$600,207. The number of operators totalled 13 and the quantity of ore hoisted amounted to 25,550 tons; in addition, 18,532 tons of ore were salvaged from the surface, ores milled in the camp during 1942 totalled 43,851 tons.

During the year under review, operations conducted by the Nipissing Mining Company Limited were restricted to the milling of ore salvaged from the surface. Cobalt Products Limited carried on mining at the old Foster, Provincial and Agaunico mines, and operated its mill continuously throughout the year. Both the O'Brien mine in Coleman township and the Miller Lake O'Brien property in Haultain township were reported as active during the year, while the customs mill operated by C. N. J. O'Shaughnessy was in production from May until November. Other properties operated chiefly under lease included the Cobnor, Tretheway, Coniagas, Kerr Lake, Sanymac, Sycee, Frontier Larrain and Silver Bar. Shipments of cobalt ore were also made from a property located at Werner Lake in the Kenora district of Ontario.

Table 67.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada, 1942

	1942
Number of mines in operation (*).....	14
Ore mined.....	(b) 44,082 tons
Ore treated (milled) (a).....	43,851 tons
Tailings treated.....	.....
Concentrates produced.....	.....
Gross value of bullion, ore, concentrates and residues sold.....	\$ 1,415
Cost of freight.....	\$ 750,250
Smelter charges.....	\$ 1,439
Cost of fuel and purchased electricity used.....	\$ 16,255
Cost of process supplies used.....	\$ 68,349
Net value of sales.....	\$ 64,000
	\$ 600,207

(*) All mines located in Northern Ontario and includes properties on which the operations consisted only in salvaging ore from dumps, etc.

(a) Does not include crude ore shipped.

(b) Includes 18,532 tons salvaged from surface.

Table 68.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1942

	\$
Present cash value of the land (excluding minerals).....	14,292
Present value of buildings, fixtures, machinery, tools and other equipment.....	117,972
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	23,040
Inventory value of finished products on hand.....	31,304
Operating capital (cash, bills and accounts, receivable, prepaid expenses, etc.).....	172,083
Total.....	358,691

Table 69.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1942

	Number	Salaries and wages
SALARIED EMPLOYEES—		\$
Total.....	(a) 27	63,722
WAGE-EARNERS—		
Surface.....	54	220,258
Underground.....	80	
Mill.....	31	
Total.....	165	220,258
Grand Total.....	192	283,980

(a) Includes 3 females.

Table 70.—Number of Wage-Earners on Payroll or Time Record on the last day of Each Month, or Nearest Representative Date, in the Silver-Cobalt Mining Industry, 1926 and 1942

Month	1926	1942			Total 1942
		Mine		Mill	
		Surface	Under- ground		
January.....	1,496	42	89	13	144
February.....	1,456	34	62	13	109
March.....	1,501	41	61	13	115
April.....	1,478	47	74	20	141
May.....	1,480	53	82	44	179
June.....	1,490	56	79	48	183
July.....	1,501	64	90	46	200
August.....	1,533	69	84	47	200
September.....	1,592	67	84	44	195
October.....	1,500	58	81	41	180
November.....	1,478	62	84	26	172
December.....	1,426	44	92	14	150

(b) The Silver-Lead-Zinc Mining Industry

Quebec.—At Montauban in Portneuf county, the old Tetreault mine was active from June 1; milling was conducted at the property from August 15. This mine was operated by Wartime Metals Corporation for the account of Metals Reserve Company of the United States under the management of Siscoe Metals Limited. Zinc and lead concentrates were exported to the United States.

New Calumet Mines Limited carried out extensive surface and underground development operations on a large lead-zinc deposit located on Calumet Island in Pontiac county. Considerable construction was completed and the mine was expected to come into production about midsummer of 1943.

Milling operations were commenced on August 4 by Golden Manitou Mines Ltd. at its property located in Bourlamaque township. Important shipments of zinc concentrates were made to the Metals Reserve Company in the United States. In addition to the production of zinc, this company recovers a considerable quantity of gold and silver in the form of precipitate.

In Lemieux township, Gaspé North, prospecting of lead-zinc deposits was carried on by Lyall and Beidelman and the Federal Zinc & Lead Company Limited.

Ontario.—Lake Geneva Mining Company Limited operated both its mine and mill located in Hess township, Sudbury district. Operations were continuous throughout the year and silver, lead and zinc concentrates produced were exported to the United States.

Zinc ore from the dump of the old Richardson mine situated at Long Lake, Frontenac county, was purchased and concentrated by Geo. Beausoleil & Company. Zinc concentrates obtained from these operations were shipped to the United States.

British Columbia.—At Kimberley the great Sullivan mine of the Consolidated Mining & Smelting Company of Canada Limited was in continuous production throughout the entire year. The company reported that mining costs increased during the year due partly to preparation for stope-filling, to taking more ore from the lower levels and to higher wages. It will be necessary to increase the rate of back-filling in order to draw more ore from the pillars. The grade of the ore mined was slightly lower with a higher zinc to lead ratio. Development work was very satisfactory. The ore reserves have been maintained in spite of the increased tonnage mined. The production of tin from the concentrator tailings was commenced early in the year. To the end of February, the number of men and women who had left to join His Majesty's Forces totalled 1,703.

Base Metals Mining Corporation, Limited, reported that mining and concentrating operations were carried on at Field throughout the year. Tonnage concentrated was lower than in 1941 chiefly because of labour shortage on the underground crew and power plant breakdowns. Grade of ore treated was lower also, because of decline in zinc content. Lead content was only slightly lower than for 1941. All concentrates produced were shipped to smelters in the United States. At the end of 1942 positive and probable ore reserves were sufficient for more than ten months' operation at the average monthly tonnage of 1942. There is an excellent chance of adding to this, as the Kicking Horse development proceeds. Labour turnover was high, and there was a serious shortage from July to November. The force was adequate at the end of the year. Practically all labour replacements were inexperienced men.

At Zincton in the Slocan mining division, the Lucky Jim mine was operated continuously by Zincton Mines Limited; silver-zinc concentrates produced by this company were shipped to Great Falls, Montana, U.S.A. for treatment.

During the year under review both mining and milling operations were conducted by Western Exploration Co. Ltd. at the Standard and Mammoth mines located at Slocan Lake in the Kaslo mining division. Both silver-lead and silver-zinc concentrates produced by this company were exported to smelters in the United States.

Other important silver-lead-zinc mining operations reported during the year included those of Highland-Bell Limited and the Providence mines in the Greenwood division. Several smaller operators made shipments of silver-lead-zinc ores to the Trail smelter of the Consolidated Mining & Smelting Company of Canada Limited. In December work on the Kootenay Florence Project was commenced by the Wartime Metals Corporation.

Yukon.—Operations carried on at Wernecke Mines, Galena Hill, by the Treadwell Yukon Corporation Limited were confined solely to salvage operations. Practically the entire plant was salvaged except the mill and tramway from the Calumet mine to the mill. The company shipped lead ore and lead concentrates to the Bunker Hill smelter at Bradley, Idaho, U.S.A. In addition to the shipments made from the Wernecke mines, lead ores were also exported by operators working the Mastiff, Elsa, Hector, Clarence, Jack and Annie mines in the Mayo district.

Northwest Territories.—Mining operations were carried on from August 5 by Eldorado Gold Mines Limited at its pitchblende (silver-bearing) mine located at Echo Bay. Ore milled totalled 6,369 short tons and a considerable tonnage of pitchblende concentrates were shipped to the company's refinery situated at Port Hope, Ontario.

Table 71.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry* in Canada, 1942

	Quebec	Ontario	Yukon and Northwest Territories	British Columbia	Canada
	Tons	Tons	Tons	Tons	Tons
Ore mined.....	93,057	41,188	6,669	2,810,566	2,951,480
Ore milled.....	89,603	32,822	6,369	2,944,620	3,073,414
Concentrates produced—Lead.....	476	1,444	60	325,597	327,577
Zinc.....	7,653	5,181		390,362	403,186
Pitchblende-silver.....			292		292
Silver and silver-copper.....					

* Includes silver-pitchblende ore mined in Northwest Territories.

Table 72.—Destination of Shipments from Silver-Lead-Zinc Mines of Canada, 1942

	Tons shipped	Value at shipping point	Total metal content as determined by settlement assay			
			Gold fine oz.	Silver fine oz.	Lead pounds	Zinc pounds
		\$				
To Canadian smelters—						
Lead ore.....	9,082	446,775	580	819,458	685,139	843,839
Lead concentrates (a).....	351,849	16,951,704	6	7,975,252	479,435,732	32,967,898
Zinc concentrates (*).....	366,158	7,217,077	6	726,986	29,459,849	365,643,581
Dry ore.....	2,346	20,379	429	7,491	71,092	100,116
Precipitates.....		6,488	143	4,080		
Total.....	729,435	24,642,423	1,164	9,533,267	509,651,812	399,555,434
To Foreign smelters—						
Lead ore.....	469	108,563	14	158,455	611,501	
Lead concentrates.....	5,954	525,623	194	428,818	8,163,186	350,077
Silver concentrates.....						
Zinc concentrates (*).....	45,157	2,433,515	94	145,037	598,272	49,339,769
Precipitates.....	3	62,870	1,163	36,955		
Total.....	51,553	3,130,571	1,465	769,265	9,372,959	49,689,846
Grand Total (gross).....	781,018	27,772,994	2,629	10,302,532	519,024,771	449,245,280
Cost of freight.....		1,662,341				
Cost of fuel and purchased electricity.....		791,772				
Smelter charges.....		650,420				
Cost of process supplies.....		1,163,819				
Net Value.....		23,578,074				

(*) Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia (includes 52 tons crude ore to Canadian smelters).

(a) Includes shipment of silver-pitchblende concentrates from Northwest Territories. Information relating to content of pitchblende is not available for publication.

NOTE—In addition to the metals contained in shipments listed in this table there are important quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia. Cadmium, bismuth, tin, antimony, indium and sulphur are also recovered from these ores (silver-lead-zinc).

Table 73.—Capital Employed in the Silver-Lead-Zinc Mining Industry of Canada, 1942

Province	Present, cash value of land, excluding minerals	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	\$	\$	\$	\$	\$	\$
Ontario, Quebec, Yukon and N.W.T.*.....	1,362,418	1,658,534	530,883	255,938	532,015	4,339,788
British Columbia.....	5,542,219	7,262,966	1,437,180	151,761	750,528	15,144,654
Canada.....	6,904,637	8,921,500	1,968,063	407,699	1,282,543	19,484,442

* Includes data relating to silver-pitchblende mines in the Northwest Territories.

Table 74.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1942

Province	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground			
						\$
British Columbia.....	(a) 245	334	760	376	1,715	3,829,271
Ontario, Quebec, Yukon and N.W.T.†.....	63	182	194	31	470	901,099
Canada.....	308	516	954	407	2,185	4,730,370

†Includes data on silver-pitchblende mining operations in the Northwest Territories.

(a) Includes 26 females.

Table 75.—Number of Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1942

Month	Mine		Mill	Total
	Surface	Under-ground		
January.....	395	801	384	1,580
February.....	418	814	379	1,611
March.....	403	821	377	1,601
April.....	445	810	384	1,639
May.....	453	818	394	1,665
June.....	538	889	380	1,807
July.....	629	881	399	1,909
August.....	537	1,006	450	1,993
September.....	570	1,081	449	2,100
October.....	594	1,125	455	2,174
November.....	592	1,190	429	2,211
December.....	590	1,189	416	2,195
Average.....	516	954	407	1,877

Table 76.—Dividends Paid by Specified Silver-Lead-Zinc Mining Companies

Company	Dividend 1942	Total Dividends paid to end of 1942
QUEBEC—		
Golden Manitou Mines Ltd.....		
New Calumet Mines Ltd.....		
Siscoe Metals Ltd. (Tetreault).....		
ONTARIO—		
Lake Geneva Mining Company Ltd.....		
BRITISH COLUMBIA—		
Base Metals Mining Corporation Ltd.....		
Consolidated Mining and Smelting Company of Canada, Ltd.....	8,189,552	(b)110,076,310
Highland Bell Limited.....	105,268	580,621
Providence Mine.....	24,440	88,714
Ruth-Hope Mining Co. Ltd.....		
Western Exploration Co. Ltd.....		
Zincion Mines Ltd.....		
YUKON & NORTHWEST TERRITORIES—		
Eldorado Gold Mines Ltd. (Eldorado Mining and Refining Ltd. 1943) (a).....		
Treadwell Yukon Corporation Ltd.....	447,774†	447,774†

† Liquidating distributions.

(a) Produces Pitchblende Concentrates, etc.

(b) Includes some dividends paid in stock.

ARSENIC

Production of arsenic in Canada during 1942 totalled 14,967,874 pounds valued at \$652,041. Comprising this output was the refined arsenic (As_2O_3) produced at Deloro, Ontario by the Deloro Smelting & Refining Company Limited from Ontario silver-cobalt ores and from crude arsenic received from O'Brien Gold Mines Limited and Beattie Gold Mines Limited in the province of Quebec; also included was the arsenic content of crude arsenic shipped by Beattie Gold Mines to firms other than the Deloro Smelting & Refining Company Limited. The arsenic content of auriferous concentrates exported from British Columbia to the United States by Bralorne Mines Limited, Hedley Mascot Gold Mines Limited and Kelowna Exploration Company Limited, was recorded as production in 1942. The arsenic content of these shipments is not paid for by the American smelters and the value of the arsenic was estimated by the Bureau of Statistics at a nominal price of one cent a pound.

Crude arsenic is also recovered at the Little Long Lac mine in the Thunder Bay District of Ontario; however, no commercial shipments from this source were reported during the year under review.

Production of arsenic in all forms from Canadian ores since 1885 to the end of 1942 amounted to 77,593 short tons valued at \$7,396,895.

"Arsenic is used chiefly in the manufacture of insecticides. It is also used in the preparation of weed killers, sheep and cattle dip, wood preservatives, and in the manufacture of glass, minor uses being in pigments, tannery supplies, and pharmaceutical preparations. Arsenic salts are used to replace creosoting in the preservation of wood. The use of arsenic to manufacture chemical warfare materials has notably increased its consumption. Calcium arsenate, and to a much lesser extent, lead arsenate are the arsenicals ordinarily used in insecticides. Paris green, which is a copper acetoarsenite, is also used as an insecticide. Magnesium arsenate and manganese arsenate have also been used for this purpose. A considerable tonnage of white arsenic, in the form of crude arsenic or as sodium arsenite is used in the manufacture of weed killers. High-grade white arsenic is used in glass as a decolourizer, opacifier and refining agent. Small quantities of arsenic are used in the paint industry, as realgar or arsenic disulphide (As_2S_2) and as orpiment or arsenic trisulphide (As_2S_3).

"Although the world consumption of white arsenic has varied greatly during the past ten years, the quoted price remained steady at $3\frac{1}{2}$ cents a pound up to the middle of 1941. As most of it is a by-product of metal recovery, through necessity rather than choice, and as the potential supply is far in excess of any normal demand, there seems to be little likelihood of any sustained increase in price.

"The nominal price of arsenious oxide in New York remained at $3\frac{1}{2}$ cents a pound in the first half of 1941 and at about $3\frac{3}{4}$ cents during the last half of the year. In 1942 the price remained fixed at 4 cents a pound. The Canadian price of white arsenic, as given by Canadian Chemistry & Process Industries, remained at $5\frac{1}{2}$ to 6 cents a pound throughout 1942."—(Bureau of Mines, Ottawa.).

Table 77.—Production of Arsenic in Canada, 1933-1942

Year	Arsenic in ore exported		White arsenic (†)	
	tons	\$	tons	\$
1933.....			734	56,534
1934.....			824	56,412
1935.....			1,279	75,326
1936.....			683	42,491
1937.....			695	41,032
1938.....			1,088	56,538
1939 (x).....			871	52,257
1940.....			1,047	62,798
1941.....			1,769	153,195
1942.....	3,557	71,148	3,927	580,893

(x) In addition crude arsenic was recovered at certain mines during 1939 in the treatment of Quebec and Ontario gold ores but no commercial shipments were reported.

(†) 1933-1940 recovered at the Deloro smelter from Ontario silver-cobalt ores only; in 1941 and 1942 includes arsenic recovered at Deloro, Ont., from crude arsenic received from Quebec gold mines plus the arsenic content of crude arsenic shipped to other than the Deloro smelter.

Table 78.—Consumption of Arsenious Oxide and Arsenic Acid in the Manufacture of Canadian Insecticides, 1932-1942

Year	Pounds	\$	Year	Pounds	\$
1932.....	1,721,044	69,250	1938.....	3,029,145	93,873
1933.....	3,116,401	110,011	1939.....	4,287,435	132,584
1934.....	4,709,443	168,185	1940.....	3,607,444 (x)	122,265
1935.....	2,736,089	86,983	1941.....	5,707,499 (x)	212,687
1936.....	3,368,956	106,132	1942.....	6,106,887 (x)	273,919
1937.....	3,296,559	102,651			

(x) In addition, 342,452 pounds of calcium arsenate valued at \$21,671 were used in 1940 and 509,381 pounds at \$34,704 in 1941 and 394,978 pounds at \$26,773 in 1942.

COBALT

Cobalt.—The Canadian output of cobalt comes entirely from the cobalt-bearing deposits of Northern Ontario and usually includes cobalt recovered and sold in the metallic state, the cobalt content of oxides and salts made and sold and the metal content of cobaltiferous ores exported. Canadian production in 1942 totalled 83,871 pounds valued at \$88,444, all contained in ores or concentrates shipped to other than Deloro, Ontario and exclusive of metal contained in ores placed on a Government stock pile at Deloro.

There is at present only one smelter in Canada treating cobalt ores; this is the plant of the Deloro Smelting and Refining Company, Limited, located at Deloro, Ontario. In 1942 the company did not recover any cobalt from Canadian ores; however, considerable quantity of the metal in various forms was produced at Deloro from African ores during the year under review. In 1942 a relatively large quantity of Ontario silver-cobalt ores were received at Deloro on account of the United States Government. These were stock piled for future use and their metal content will be credited as Canadian production at the time of their export or possible consumption in Canada. A war-time scale of prices for cobalt ores was established by the Canadian Metals Controller in 1942 and is based largely on the cobalt content of the ores or concentrates.

The greater part of the world output of cobalt is used for metallurgical purposes; important quantities are also consumed by the ceramic industries. It is a very important constituent in some of the high speed cutting tools.

The nominal price for cobalt ores, 13 per cent grade, f.o.b. cars, Ontario, remained at about \$1.00 a pound of cobalt until July, 1942 and at \$1.10 for the remainder of the year.

Since 1904, the first year for which cobalt production was recorded in Canada, there were produced, to the end of 1942, in all forms, 34,205,142 pounds of cobalt valued at \$33,501,404.

Table 79.—Cobalt Salts Used in the Manufacture of Canadian Pigments and Paints, 1935-1942

Year	Pounds	\$	Year	Pounds	\$
1935.....	110,419	33,292	1939.....	52,979	21,638
1936.....	170,932	43,230	1940.....	89,332	28,111
1937.....	37,258	17,062	1941.....	74,445	39,349
1938.....	43,703	17,993	1942.....	200,228	145,433

SILVER

Production of newly mined silver in Canada in 1942 totalled 20,695,101 fine troy ounces valued at \$8,726,296 compared with 21,754,408 fine troy ounces worth \$8,323,454 in 1941. The average price of the metal in Canadian funds was 42.17 cents per troy ounce in 1942 and 38.26 cents in 1941. The greatest annual production of silver in Canada was in 1910, in which year an output of 32,869,264 fine ounces was recorded; the highest average yearly price per fine ounce for the metal in Canada was 111.122 cents in 1919. Production of silver in Canada since 1887, the first year for which data are available, to the close of 1942 totalled 849,948,250 fine ounces valued at \$480,857,059.

The following information was abstracted from the 1942 Annual Review of the Silver Market, published by Handy and Harman, New York:

"The story of silver for 1942 must necessarily be incomplete; uncertainty of communications, censorship, and the disruption by warfare have caused a scarcity of information from abroad which makes our report on foreign markets lacking in many respects. Regarding the situation in the United States, there is but one outstanding feature—the transition of silver from civilian life to active service in America's war effort, a transition which involved at times sharp conflict between the natural law of supply and demand, politics, and control administered by Government agencies. . . . Silver consumption figures are available only for the United States and Canada; of the Canadian total of 4,000,000 ounces, about 40 per cent, represents war and essential

uses. Only if their silver was not needed in Canada were producers granted a licence to export, thereby permitting them to obtain the equivalent of 45 cents an ounce. Nearly 60 per cent of the amount of silver consumed in the United States during 1942 is estimated to have gone into war production, or into uses classified by the War Production Board as essential, and thus covered by priority ratings. This silver was used mostly in the production of photographic film, airplane engine bearings, solders and brazing alloys, electrical contacts, insignia, silver-plated eating utensils for the Army and Navy, and chemical equipment. Silver brazing alloys and electrical contacts made of silver have had the most widely diversified use in war production. In general it can be said that silver is finding an important place in the production of every airplane, battleship, submarine, cargo vessel or tank, and in many guns, bombs, torpedoes, shells and vital parts of other weapons. Our information on the subject of foreign production is very scanty; we venture the following estimate covering the Western Hemisphere only: United States, 54,000,000 ounces; Canada, 21,000,000 ounces; Mexico, 74,000,000 ounces; Central America and the West Indies, 4,300,000 ounces; and South America, 29,000,000 ounces. We have no figures whatsoever for Europe, Asia, Africa and Australia."

Table 80.—Production of Silver in Canada, by Provinces and by Sources, 1941 and 1942

	1941		1942	
	Quantity	Value	Quantity	Value
		\$		\$
NOVA SCOTIA—				
In gold bullion.....Total	673	257	446	188
QUEBEC—				
In anode copper.....	1,467,574	561,508	1,438,907	606,730
In gold bullion made and in concentrates exported.....	189,508	72,508	216,135	91,135
Total.....	1,657,082	634,016	1,655,042	697,865
ONTARIO—				
In silver recovered in Canada from cobalt ores.....	383,720	146,815	837,615	353,189
In gold bullion.....	552,223	211,286	465,275	196,188
In blister copper.....	2,462,282	942,094	2,188,004	922,593
In ores, concentrates, residues, matte, etc., exported.....	1,579,251	604,237	961,893	405,592
Total.....	4,977,476	1,904,432	4,452,787	1,877,562
MANITOBA—				
In blister copper.....	954,781	365,309	809,318	341,257
In gold bullion (gold mines).....	11,324	4,332	12,506	5,273
Total.....	966,105	369,641	821,824	346,530
SASKATCHEWAN—				
In blister copper.....	2,039,074	780,170	2,658,385	1,120,935
In gold bullion and in crude alluvial gold.....	8,090	3,096	5,747	2,423
Total.....	2,047,164	783,266	2,664,132	1,123,358
ALBERTA—				
In alluvial gold.....Total	21	8	2	1
BRITISH COLUMBIA—				
In alluvial gold.....	7,880	3,015	5,923	2,498
In gold bullion.....	119,756	45,820	82,031	34,589
In base bullion and in ores, etc., exported.....	11,106,152	4,249,325	10,508,250	4,430,909
Total.....	11,233,788	4,298,160	10,596,204	4,467,996
YUKON—				
In alluvial gold.....	15,934	6,097	17,321	7,304
In silver-lead ores exported.....	840,838	321,713	464,812	195,992
Total.....	856,772	327,810	482,133	203,296
NORTHWEST TERRITORIES—				
In pitchblende-silver ores shipped to smelters (a) and in gold bullion.....Total	15,327	5,864	22,531	9,500
Canada—Total.....	21,754,408	(b) 8,323,454	20,695,101	(c) 8,726,296

(a) No recovery from pitchblende ores in 1941 or 1942; includes 19 oz. in gold ores exported in 1942.

(b) Silver in all crude ores, etc., exported totalled 3,711,186 ounces.

(c) Silver in all crude ores etc., exported totalled 956,193 ounces.

NOTE.—For 1942 silver was valued at 42.17 cents per fine ounce, the average price of the metal on the New York market adjusted and expressed in Canadian funds; for 1941 the corresponding price was 38.261 cents.

Table 81.—Source of Canadian Silver Production, by Percentages, 1939-1942

Source	1939	1940	1941	1942
In silver-cobalt ores.....	6.5	5.38	2.6	4.13
In base bullion (†).....	(*) 39.7	(*) 44.39	45.3	46.16
In gold ores (bullion and placer).....	4.6	3.60	4.1	3.71
In blister and anode copper.....	23.6	27.62	31.8	34.28
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores).....	25.6	19.01	16.2	11.72
	100.0	100.0	100.0	100.0

(†) Chiefly from silver-lead ores.

(*) Includes silver recovered in Canada from pitchblende-silver ores.

Table 82.—Silver Consumed in Specified Canadian Industries, 1941 and 1942

	1941		1942	
	Fine oz.	Value	Fine oz.	Value
		\$		\$
Scientific equipment..... (a)	690,516	268,349	744,175	295,189
Fountain pens and pencils.....				
Jewellery and silverware (fine silver).....		1,144,409		1,476,788
Jewellery and silverware (silver alloys).....		646,528		754,421
Medicinal and pharmaceutical preparations (bullion).....	90,203	35,912	141,875	57,928
Miscellaneous chemicals.....	10,928	4,370	6,944	2,780

(a) Consumed largely in the manufacture of photographic film.

LEAD AND ZINC

The following is from a review of lead and zinc in 1942 by O. W. Roskill and is from the annual review number of "The Mining Journal", London:

"Information about lead and zinc in 1942 has been very scanty. In the case of Germany and occupied Europe, the zinc supply has probably continued to be relatively satisfactory, with a possible tendency for high-grade metal to be in short supply. The lead position is probably less good, but in view of the opportunities for curtailment of consumption for building and cables in war compared with peace it is doubtful if the lead shortage is likely to have any serious effect on the Axis. So far as the United Nations are concerned, most of what information there is has come from across the Atlantic, and beyond the general presumption that the Empire output has again risen there is little detailed information, except for Canada. Broadly speaking, the lead supply position of the United Nations is quite satisfactory, while the zinc position gives rise to somewhat more anxiety. The British price of lead remained unchanged at £25 per ton throughout 1942. The British price of foreign spelter (duty paid) remained unchanged at £25 15s. per ton throughout 1942 and of electrolytic at £27 5s.

Table 83.—Refined Lead Production in Canada,* 1929-1942

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1929.....	304,449,673	1936.....	1363,449,490
1930.....	304,471,706	1937.....	1399,394,939
1931.....	278,448,457	1938.....	1400,763,914
1932.....	253,136,522	1939.....	1381,137,424
1933.....	254,565,861	1940.....	1440,175,333
1934.....	1314,457,735	1941.....	1456,054,164
1935.....	1327,515,277	1942.....	1486,612,849

* Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C., and also the pig lead from Galetta, Ont., until 1931.

† Primary lead only.

Table 84.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1941 and 1942

Industry	Items used	1941	1942
		Pounds	Pounds
Brass and copper products.....	Pig lead.....	1,459,661	1,780,402
	Scrap.....	748,746	641,465
White metal alloys.....	Pig lead.....	39,903,256	48,281,959
	Scrap lead.....	25,132,310	21,194,878
Electrical apparatus.....	Pig lead.....	37,433,241	39,690,349
	Scrap lead.....	207,713	127,733
Iron and steel.....	Lead.....	2,526,060	6,050,628
Ammunition.....	Pig lead.....	8,810,880	10,467,968
Total Accounted for.....		116,221,867	128,235,382

Table 85.—Refined New Zinc Produced in Canada, 1933-1942

Year	Price † per pound	Short tons	Year	Price † per pound	Short tons
	cents			cents	
1933.....	3-21	91,946	1938.....	3-07	171,932
1934.....	3-04	134,917	1939.....	3-07	175,641
1935.....	3-10	149,523	1940.....	3-411	185,722
1936.....	3-31	151,103	1941.....	3-411	213,608
1937.....	4-90	158,542	1942.....	3-411	215,795

† In Canadian funds.

Table 86.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1941 and 1942

Industry	Items used	1941	1942
		Pounds	Pounds
Brass and copper products.....	Zinc ingots and slabs.....	50,061,499	76,990,715
	Zinc scrap.....	76,044	525,767
White metal alloys.....	Zinc spelter.....	17,049,480	26,581,960
	Zinc scrap.....	1,028,061	1,746,106
Electrical apparatus.....	Zinc ingots and bars.....	2,830,304	2,826,831
	Zinc sheets.....	1,664,145	1,477,013
Acids, alkalies and salts.....	Zinc metal.....	12,896,774	16,033,434
Iron and steel.....	Zinc.....	49,327,893	45,378,520
Miscellaneous chemicals.....	Zinc sheets and spelter.....	149,619	342,000
Grand Total.....		135,504,395	171,902,346

In addition there are relatively large quantities of zinc oxide and lithopone used in the manufacture of paint.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production, prices, etc., for nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., and Clydach, Wales; during recent years matte was also exported to Norway, however, exports to that country ceased after its invasion by Germany in 1940.

As thus described, the industry in Canada constitutes the national source of nickel, most of the platinum group metals and a large part of the Canadian copper production. Gold, silver, sulphur, tellurium and selenium in increasing quantities are also recovered from these ores.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 11 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production statistics on nickel, copper and the metals of the platinum group are given in this chapter.

General Review

The industry as thus defined realized an estimated gross value of \$128,340,860 for its entire production in 1942 as compared with the previous all-time high record of \$117,287,713 in 1941. The quantity of nickel produced was the greatest ever recorded for any single year in the history of the industry and is a tribute to the energy and efficiency displayed by the operators in an all-out war effort.

Almost the entire production of Canadian nickel in 1942 originated, as in previous years, in the nickel-copper ores of the Sudbury district, Ontario, and represented the recovery of the metal in the refined state, in oxides and salts, and in matte exported. In addition to the nickel obtained from the Sudbury ores, there is a relatively small quantity of the metal recovered annually in the treatment of silver-cobalt ores from the Cobalt district of Northern Ontario.

Copper recovered from nickel-copper ores in 1942 represented 51.1 per cent of the total quantity of new copper produced from all sources in the Dominion during the year under review compared with 51.8 per cent in 1941. The nickel-bearing deposits of the Sudbury area also contain relatively high values in platinum metals which are recovered in refining operations.

In addition to production of nickel, copper and the platinum metals, there is an important recovery from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also salvaged in the gaseous state from waste smelter gases. Silver recovered from nickel-copper ores in 1942 comprised 10.8 per cent of the total quantity produced from all primary sources in the Dominion, and the quantity of gold obtained from these ores during the same period totalled 70,861 fine ounces. The nickel-copper deposits of the Sudbury area are now considered as the world's chief single source of the platinum metals.

Two companies operated both producing mines and metallurgical plants in the Sudbury area in 1942. The International Nickel Company of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ont., while the Falconbridge Nickel Mines, Ltd. smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treated their matte in a refinery located at Kristiansand, Norway, until the invasion of that country by Germany in 1940. Matte produced by the Falconbridge Nickel Mines Ltd. is now treated in the Canadian plants of the International Nickel Company of Canada, Limited. Both these companies operated to capacity during the year.

Throughout 1942 the International Nickel Company carried on mining operations at and made ore shipments from the Creighton, Frood, Garson and Levaek mines. The company also conducted development work throughout the entire year at the Murray mine in McKim township.

The Bureau of Mines, Ottawa, described other nickel mining operations in the Sudbury district during 1942 as follows:

"Ontario Nickel Corporation Limited actively developed the nickel-bearing property in MacLennan township, southeast of Capreol, district of Sudbury. Considerable drifting, cross-cutting and raising was carried out. A power line was brought in from the Falconbridge line, a distance of $7\frac{1}{2}$ miles, a substation erected and a full set of mining buildings were put up, including head-frame, compressor house, machine shop, office building, and cookery and living quarters. An average of thirty-five men were employed during 1942, commencing in April. Early in 1943 the company was arranging to ship crude ore to one of the smelters.

"Nickel Offsets, Limited, with a property in Foy township, west of Capreol, Sudbury district, continued the extensive surface exploration and diamond drilling that was started in 1939. A shaft was sunk in 1941 to a depth of 500 feet, to open three levels, at 250-foot, 350-foot, and 500-foot horizons, and underground development was started in the latter part of that year. Further development work was carried on during 1942 on these three levels, with encouraging results. Sinking operations were resumed in December 1942, with an objective depth of 1,280 feet. Diamond drilling indicated ore averaging 1.9 per cent nickel and 1.5 per cent copper, and containing \$2.00 a ton in precious metals, with mining widths up to 30 feet. The underground development has shown a substantially higher content of metals. It is planned to commence mining and shipping ore by late spring in 1943.

"Denison Nickel Mines Limited did not operate its property in Denison township, near Worthington, southwest of Sudbury, but hopes to reopen the mine in 1943.

"Clifton Consolidated Mines Limited took over the old Alexo nickel-copper property at Porquis Junction, Cochrane mining division. A new company—Harlin Nickel Mines Limited—was formed late in 1942 to operate the property and ore shipments commenced in 1943."

The annual report of the International Nickel Company of Canada Limited for 1942 contained the following information:

"The war demand for our metals continues unabated and deliveries are directed by governmental authorities. It is gratifying to report, as forecast a year ago, that the increase in production of nickel in all forms of 50,000,000 pounds over the 1940 output has been realized. Work on production expansion has progressed according to schedule and is largely completed. The expanded production of nickel already attained, coupled with conservation in its applications and organized salvage of nickel-bearing scrap, has eased a threatened shortage of supply. It would now appear that a sufficient tonnage of this strategic metal is available to meet all vital requirements of our armed services. While in no way lessening its war efforts, the company has long been formulating plans in preparation for the post-war period."

Falconbridge Nickel Mines Limited in its annual report for 1942 stated:

"The program to expand capacity begun in 1941 was completed by the middle of the year. At the further request of the Government, another blast furnace was ordered during the year and will be in operation some time during the first quarter of 1943. Through the maintenance of Falconbridge mine reserves, in spite of the increased rate of extraction, and the favourable results presented by the exploration program at other properties, the total ore reserves again show a moderate gain."

Capital employed in Canada by the nickel-copper mining, smelting and refining industry in 1942 totalled \$159,777,493; employees numbered 13,778 and \$28,356,141 were distributed as salaries and wages. Fuel and electricity used were valued at \$11,188,825 and the cost of chemicals, explosives and other process supplies consumed amounted to \$15,911,153."

Table 87.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1940-1942 (*)

	1940	1941	1942
	(a)	(a)	(a)
Number of firms.....	3	3	4
Number of mines.....	6	6	8
Number of smelters.....	3	3	3
Number of copper refineries.....	1	1	1
Number of nickel refineries.....	1	1	1
Capital employed.....	\$ 132,818,804	140,844,747	159,777,493
Number of employees—On salary.....	928	963	1,098
On wages.....	11,411	11,796	12,680
Total.....	12,339	12,759	13,778
Salaries and wages—Salaries.....	\$ 2,623,307	2,831,984	3,184,248
Wages.....	\$ 19,945,580	22,438,513	25,171,893
Total.....	\$ 22,568,887	25,270,497	28,356,141
Fuel and purchased electricity used (2).....	\$ 9,048,885	10,213,183	11,188,825
Process supplies used (1).....	\$ 13,150,095	13,991,741	15,911,153
Estimated gross value of matte exported and Canadian refinery products.....	\$ 103,109,213	117,287,713	128,340,860
Value of production less items (1) and (2).....	\$ 80,910,233	93,082,789	101,240,882

(*) Does not include data for mines, power plants, etc., operated by subsidiary companies.

(a) All in Ontario.

Table 88.—Output from Canadian Nickel-Copper Mines and Smelters, 1939-1942 (Short tons)

	1939	1940	1941	1942
Ore shipped from mines.....	7,850,636	8,336,196	9,969,843	112,072,485
Ore treated (*).....	7,839,187	8,342,323	9,974,409	12,078,722
Blister copper produced in Ontario (a).....	155,860	167,908	158,788	146,362
Nickel produced in Ontario (b).....	65,883	83,739	97,033	102,478
Matte exported (c).....	71,315	58,398	67,904	61,226
Nickel content of matte exported.....	47,057	38,867	43,955	40,112
Copper content of matte exported.....	8,212	5,835	7,735	7,582

(*) Represents the tonnage of crude ore smelted together with the tonnage of ore milled.

(a) Copper content.

(b) Includes nickel content of salts and oxides produced from nickel-copper ores only.

(c) Less a relatively small tonnage of matte returned to Canada for retreatment.

† In addition 3,400 tons of copper-nickel ore were mined at new properties under development but not shipped.

Table 89.—Capital Employed in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1942

	\$
Present cash value of land (excluding minerals).....	128,390,391
Present value of buildings, fixtures, machinery, tools and other equipment.....	18,934,810
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	4,005,779
Inventory value of finished products on hand.....	8,446,513
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	
Total.....	159,777,493

Table 90.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1940

	On salary		Mine		Mill	Total	Salaries and wages
	Male	Female	Surface	Under-ground			
Salaried employees—							\$
Mine and mill.....	345	23				368	1,124,038
Smelters and refineries.....	610	120				730	2,060,210
Total.....	955	143				1,098	3,184,248
Wage-earners—							
Mine and mill.....			1,302	5,202	275	6,779	14,241,169
Smelters and refineries.....			5,901			* 5,901	10,930,724
Total.....			7,203	5,202	275	* 12,680	25,171,893
Grand Total.....	955	143	7,203	5,202	275	13,778	28,356,141

* Includes 96 females.

Table 91.—Number of Wage-Earners Employed in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, by Months, 1941 and 1942

Month	1941	1942	Month	1941	1942	
					Male	female
January.....	11,428	12,112	July.....	11,877	12,870	.....
February.....	11,575	12,199	August.....	11,998	12,287	.....
March.....	11,580	12,014	September.....	11,996	12,234	101
April.....	11,554	12,143	October.....	12,076	12,961	262
May.....	11,581	12,560	November.....	12,137	13,216	379
June.....	11,521	12,966	December.....	12,048	13,444	411

Table 92.—Dividends Paid by Specified Nickel-Copper Mining Companies

	Dividend 1942 *	Total Dividends paid to end of 1942*
International Nickel Co. of Canada Ltd., only.†.....	\$ 34,511,638	\$ 297,509,989
Falconbridge Nickel Mines Ltd.....	600,626	8,135,960

† Letters Patent granted July 25, 1916.

* Canadian dollars.

NICKEL

Production figures include nickel in matte exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts. Distribution of nickel, now restricted to essential war uses, remains entirely under the direction of governmental agencies. Canadian nickel production in 1942 totalled 285,211,803 pounds.

COPPER

Canadian primary copper production from all domestic sources totalled 603,661,826 pounds valued at \$60,417,372 in 1942 compared with 643,316,713 pounds worth \$64,407,497 in 1941. The decrease in output from 1941 resulted largely from a shortage of skilled labour in the mines and reflected the increasing problem of sufficient man power to cope with the complex demands of a global war. Of the total quantity of copper produced in the Dominion in 1942, the mines of Ontario contributed 51.1 per cent and Quebec 23.3 per cent. The combined output from Manitoba and Saskatchewan, originating almost entirely in the Flin Flon mine, comprised 17.3 per cent of the 1942 recoveries. Production in British Columbia, largely from the Granby and Britannia deposits, contributed 8.3 per cent. A relatively small production in the North-west Territories represented copper contained in auriferous concentrates exported to the U.S.A.

The total figure of Canadian production for 1942 included 538,020,995 pounds of the metal contained in blister and anode copper produced in Canadian smelters and 65,640,831 pounds in ores, matte, etc., exported. The output in 1942 was evaluated in Canadian funds at 10.086 cents per pound for metal contained in blister and anode copper produced and in ores and concentrates exported. Copper in matte exported was estimated at 7 cents a pound.

Data relating to world production of copper are now almost negligible. The Mining Journal, London, comments as follows: "To attempt any review of the copper industry in 1942 along customary lines, where attention is devoted principally to the production in various copper mining fields, to estimates of consumption, and to a recension of copper prices and market features is obviously impossible today. The vital fact remains that supplies in Great Britain and apparently in the United States were sufficient to enable all consumer requirements to be promptly met. We have no data on the extent to which substitution of other materials for copper has eased the situation. That in the last resort this practice can solve difficulties is illustrated in the case of Germany. They have little copper, but this has not hitherto prevented them from equipping huge armies. The categorical imperative, "must" is the answer to any complaints of "can't" in war industry".

Table 93.—Production of Copper in Canada, by Provinces and Sources, 1941 and 1942

	1941		1942	
	Pounds	Value \$	Pounds	Value \$
PRODUCTION—				
By Provinces—				
Quebec.....	143,783,978	14,502,052	140,911,876	14,212,372
Ontario.....	333,829,767	33,192,644	308,282,414	30,625,404
Manitoba.....	67,018,563	6,759,492	47,595,586	4,800,491
Saskatchewan.....	32,324,512	3,260,250	56,781,466	5,726,979
British Columbia.....	66,327,166	6,689,758	50,015,521	5,044,565
Northwest Territories.....	32,727	3,301	74,963	7,501
Total.....	643,316,713	64,407,497	603,661,826	60,417,372
By Sources—				
In blister and anode copper produced.....	561,055,782	56,588,086	538,020,995	54,264,798
In ores, concentrates and copper matte exported (*).....	66,790,216	6,736,461	50,476,883	5,091,098
In nickel copper matte exported.....	15,470,715	1,082,950	15,163,948	1,061,476
Total.....	643,316,713	64,407,497	603,661,826	60,417,372

(*) Contains a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters; no copper matte exported in 1941 or 1942.

Table 94.—Production (†) of Refined Copper in Canada for Years Specified

Year	Ton	Year	Ton
1916*.....	483	1935.....	173,290
1917.....	3,901	1936.....	191,595
1918.....	3,809	1937.....	215,080
1919.....	3,467	1938.....	227,204
1930.....	31,377	1939.....	231,684
1931.....	92,183	1940.....	261,878
1932.....	90,077	1941.....	278,224
1933.....	112,245	1942.....	268,447
1934.....	149,261		

*First electrolytic copper produced commercially in Canada, at Trail, B.C.

† From all sources.

NOTE—Electrolytic copper refinery at Copper Cliff, Ont., came into production in 1930; electrolytic copper refinery at Montreal East came into production in 1931.

Table 95.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1941 and 1942

Industry	Item (Used)	1941	1942
Brass and copper products (a).....	(Ingots, wire bars, slabs, etc.)..... lb.	276,679,478	335,793,693
	Scrap..... lb.	12,199,005	12,617,777
	Pipe and tubing..... lb.	188,074	191,106
	Plates and sheets..... lb.	971,838	846,308
	Wire..... lb.	384,929	348,000
White metal alloys.....	(Scrap, all kinds..... lb.	10,200,476	9,669,323
	(Copper—ingots and slabs..... lb.	590,178	4,470,119
Electrical apparatus and supplies.....	(Castings..... lb.	480,687	148,237
	Ingots, slabs, wire bars, etc..... lb.	2,109,395	2,036,221
	Rods..... lb.	61,700,539	62,982,899
	Scrap..... lb.	91,333	149,731
	Tubing and pipe..... lb.	641,402	542,064
	Sheets and plates..... lb.	846,949	883,936
	Wire, bare..... lb.	8,007,762	7,862,294
	Wire, enamelled..... \$	902,013	711,706
Iron and steel and their products.....	Wire, other insulated..... \$	1,577,960	1,551,529
	Copper sheets, bars, etc..... lb.	17,400,122	18,629,920

(a) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable; duplication to this extent results from the inclusion of these rods in the Electrical Apparatus Industry.

(b) Not available.

Table 96.—Canadian Copper Ore Reserves as Officially Reported
(American Bureau of Metal Statistics)

	Year	Province	Short tons ore	Average grade	Short tons copper
				%	
Falconbridge (a).....	1940	Ontario.....	7,502,000	0.94	70,500
Granby Consolidated—Allenby.....	1941	British Columbia..	16,707,600	1.32	220,500
Hudson Bay.....	1938	Manitoba.....	27,534,000	2.23	614,000
International Nickel (a).....	1939	Ontario.....	224,594,000	.....	(b)7,214,000
Noranda.....	1939	Quebec.....	29,513,000	2.32	684,700
Normetal.....	1935	Quebec.....	782,600	2.13	16,700
Sherritt Gordon.....	1939	Manitoba.....	4,860,000	2.38	115,700
Waite-Amulet.....	1939	Quebec.....	.....	.....	.....
Amulet section.....	1940	Quebec.....	270,000	2.70	7,300
Waite section.....	.....	Quebec.....	550,000	4.25	23,400
Britannia.....	.....	British Columbia..	(c)	(c)	(c)
Aldermac Mines Ltd.....	1938	Quebec.....	1,716,000	2.00	34,300
Amulet Dufault (d).....	1940	Quebec.....	3,260,000	6.30	205,400

(a) Also produces nickel.
took over "Lower A" orebody of Waite-Amulet.

(b) Copper-nickel content.

(c) Data not available.

(d) New Company which

METALS OF THE PLATINUM GROUP

The entire output of new metals of this group in 1942 was derived from the nickel-copper ores of the Sudbury district in Ontario, with the exception of 40 ounces of platinum recovered from alluvial deposits in the province of British Columbia.

Production from Ontario ores represented recoveries made from precious metal concentrates shipped by the International Nickel Company of Canada Ltd. and treated in plants located at Acton, England, and Newark, New Jersey, U.S.A.; precious metals contained in matte made at the Falconbridge smelter were recovered in Norway until April, 1940, at which time the refinery of the company was seized by the German army; since then all matte made at the Falconbridge smelter was treated in the plants of the International Nickel Company of Canada Ltd. and recoveries of such metals were included with those reported by that company.

The world production of platinum and allied metals in estimated to exceed 700,000 ounces. Canada has been the leading producer of platinum since 1934 when it displaced Russia; the other principal producers by order of importance being Russia, Colombia, and South Africa. Canada also leads as a producer of palladium, as a result of the great increase in recent years in the Canadian output of nickel. Owing to the disorganized state of the world markets and government restrictions on publication of statistics, estimates on world production and consumption for 1942 are not available. The world consumption of platinum metals in 1939 was about equal to production (about 540,000 oz.), a notable gain over the 1935 figure of consumption of 275,000 ounces.

Industrial uses of the platinum metals continued to expand in 1942. Palladium ranks second in consumption and iridium third. Osmium, rhodium, and ruthenium, are as yet consumed in relatively small quantities.

The market situation in 1942 is explained by Charles Englehard, President of Baker and Company, Incorporated, in the following, part of which is abstracted from his annual review:

"The increased war needs of the United Nations, development of new industrial processes, scientific research for more dependable materials, all combined to make 1942 the biggest year in the history of the platinum metals industry.

"It was necessary for the War Production Board (U.S.A.) in October, 1942, to restrict the use of platinum for jewelry so as to be able to meet the probable war needs of the United Nations.

"The most important war-time uses of platinum are in the chemical, electro-chemical, and electrical fields, where high resistance to corrosion, erosion, and oxidation are essential. The largest single use is as a catalyst in the production of nitric and sulphuric acid for munitions plants—various electrical uses are second in importance and are followed closely by the glass and the electro-chemical uses. There are numerous new and interesting developments with platinum in the latter field. Other important uses for platinum, as well as palladium, are for catalytic operation in organic chemistry, such as the production of essential components of vitamins.

"Many of the industrial fields have also shown heavy demand for platinum-clad materials.

"In the dental field palladium as well as gold and platinum have extended their scope of usefulness.

"Ample supplies of palladium exist to take care of jewelry requirements. For this purpose it is usually hardened with ruthenium and is similar in appearance to platinum".

Table 97.—Production of Platinum Group Metals in Canada, 1941 and 1942

	Platinum		Palladium, Rhodium, Iridium, etc.	
	Fine ounces	\$	Fine ounces	\$
1941				
Ontario.....	124,257	4,747,860	97,432	3,396,304
British Columbia.....	60	2,293		
Total.....	124,317	4,750,153	97,432	3,396,304
1942				
Ontario.....	Censured			
British Columbia.....				
Total.....				

Table 98.—Production of Certain Metals of the Platinum Group, 1926-1932*

Year	Rhodium		Ruthenium		Osmium		Iridium	
	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$	Fine oz.	\$
1926.....	204	9,969	16	791			14	3,252
1927.....	222	6,853	31	1,073			45	4,945
1928.....	895	20,951	561	16,331			342	78,953
1929.....	3,037	151,850	1,376	66,048			497	119,777
1930.....	(a) 4,133	206,650						
1931.....	(a) 7,605	431,457						
1932.....	(a) 7,886	353,308						

(a) Includes rhodium, iridium and ruthenium as other platinum metals.

* Since 1933 these metals are included with palladium.

Table 99.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1933-1942

Year		Value	Year		Value
		\$			\$
1933.....		35,714	1938.....		85,503
1934.....		38,307	1939.....		160,688
1935.....		45,627	1940.....		148,748
1936.....		101,129	1941.....		208,318
1937.....		112,295	1942.....		361,006

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics Showing Production by Provinces and Prices on Aluminium, Antimony, Barium, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Indium, Vanadium and Zirconium.

1. General Review

Metal-bearing minerals, mined in relatively small quantities by a comparatively few operators, have been grouped by the Dominion Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these, are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1942 and classified as miscellaneous include—antimony, bismuth, cadmium, iron ore, indium, magnesium, mercury, molybdenite, pitchblende products, selenium, tellurium, tin, tungsten concentrates and titanium ore. In addition to particulars relating to these metals or products, the report contains notes of a summary nature on beryl and beryllium, lithium, sodium, calcium, aluminium, vanadium and zirconium.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, indium, selenium, tellurium and tin represent by-products recovered in the refining of lead, zinc or copper and, for this reason, such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry. For convenience, the value of all tungsten concentrates shipped in 1942 is included with gold mining data.

The gross value of production credited to this industry in 1942 totalled \$5,516,241 compared with \$3,428,886 in 1941. Employees totalled 1,352 in 1942 and salaries and wages paid amounted to \$2,396,731.

ALUMINIUM

The reduction of aluminium ores and the production of primary aluminium in Canada is confined to the province of Quebec. In this province the Aluminum Company of Canada Limited operates an ore treatment plant at Arvida and reduction works at La Tuque, Shawinigan Falls and Arvida. The Shawinigan Falls and Arvida plants were in continuous production throughout 1942 and the new works at La Tuque was brought into operation in November. Work on the great Shipshaw power development in the Saguenay district was advanced rapidly by the company during the year under review. The Aluminum Company of Canada also operated fabricating plants at Shawinigan Falls and at Kingston and Toronto in Ontario. Brucite granules were also produced by the Company at Wakefield in the Gatineau valley of Quebec.

Bauxite from British Guiana, used for the production of aluminium, is washed and dried before being shipped from South America; at Arvida, Quebec, it is treated by a standard chemical process to remove impurities, and pure aluminium oxide is recovered. Cryolite, necessary in the production of the metal, is largely imported from Greenland; synthetic cryolite is also employed in making aluminium. A very great amount of electrical energy is utilized in the production of new aluminium metal from bauxite concentrates. No bauxite ores are mined in Canada and the principal producing countries are France, Hungary, United States, Yugoslavia, Italy, British Guiana, Dutch Guiana and Russia.

It was reported unofficially that the expanded Arvida operations would eventually turn out more aluminium metal than the combined world production of 1937. Aluminium was quoted at 15 cents per pound f.o.b. New York, January, 1943.

Table 100.—Consumption of Aluminium in Specified Canadian Industries, 1941 and 1942

Industry	1941		1942	
	Pounds	Cost at works	Pounds	Cost at works
		\$		\$
Aluminium products (a).....	41,832,000	8,057,820	62,442,663	12,684,015
White metal alloys*.....	1,754,472	423,519	1,357,782	276,709
Electrical apparatus and supplies.....		925,733		944,603
Brass and copper products (b).....	2,397,307	613,638	3,108,889	911,757
Iron and steel products (b) (c).....	4,844,122	1,292,379	8,892,268	2,740,947

(a) Largely for the manufacture of cooking utensils, cable, etc.

* In addition in 1942 there were consumed 4,522,053 pounds of scrap valued at \$500,596, and in 1941, 7,352,993 pounds at \$653,972.

(b) Includes scrap.

(c) Includes industries manufacturing cooking and heating apparatus, sheet metal products, etc.

ANTIMONY

Antimony production in Canada during 1942 totalled 3,041,108 pounds valued at \$516,988 compared with 3,185,077 pounds worth \$445,911 in 1941. Output in both years consisted almost entirely of the element recovered in the form of metal at Trail, British Columbia, by the Consolidated Mining & Smelting Company of Canada Limited; antimony is produced by this company from flue dust, a by-product in silver refining.

In addition to the production of the metal at Trail, a small test shipment of stibnite-bearing ore was shipped in 1942 to the United States by Mr. Walter McAlister from the "Caroline Antimony Fissure" property located in the Wheaton mining district of Yukon. The ore was obtained from an open cut working and was hand picked for shipment; the cobbled ore was reported to assay 50 per cent antimony.

In Ontario, the Gates Lake antimony deposit was diamond drilled during 1942 by the Fred Austin Antimony Syndicate. This deposit is situated in the Lower Manitou Lake area of the Kenora District.

During 1941 small shipments of crude antimony ore were made in British Columbia from the Stuart property on Ferguson Creek and from the Fraser mine, near Minto. For a number of years prior to 1917, small amounts of refined antimony ore as well as antimony were produced intermittently in the Maritime Provinces. Antimony deposits have also been worked in the province of Quebec and in Ontario the metal in small quantities has been exported in the form of a complex bullion made from silver-cobalt ores.

The market for antimony depends especially upon the demand from automobile manufacturers, as it is used largely in alloys for storage battery plates, bearing and babbitt metals, solder, rubber goods, paints and fixtures. The use of antimony in the manufacture of chemicals has increased considerably during the last two years. The principal compound is the oxide of antimony, which is employed extensively as a pigment in sanitary enamelware and nitrocellulose enamels. The expansion in the manufacture of munitions of war is also an important factor in the increasing demand for antimony. Since December, 1935 the Chinese antimony trade has been under government control.

Complete world data relating to antimony production have not been available since 1937; for that year a world production of approximately 34,502 metric tons of metal was estimated. The world's principal primary producers of the metal have been China, Mexico and Bolivia.

Engineering and Mining Journal, New York, quoted antimony metal—New York, at 15.559 cents per pound car-load lots, December 31, 1942. Antimony ore, per unit of antimony contained, 50 to 55 per cent, \$2.10 to \$2.20; 55 to 60 per cent, \$2.15 to \$2.20; 60 to 65 per cent, \$2.20 to \$2.30.

Table 101.—Antimony Used in Specified Canadian Industries, 1941 and 1942

Industry	1941		1942	
	Pounds	\$	Pounds	\$
White metal alloys—Regulus.....	1,366,077	197,622	1,818,370	264,838
Antimony ore.....	11,044	539		
Electrical apparatus and supplies.....	230,433	33,494	234,545	35,200

BERYLLIUM

"Beryl, a silicate of aluminium and beryllium, at present the only commercial source of beryllium, usually contains from 10 to 12 per cent of beryllium oxide, corresponding to 4 to 4.5 per cent of metallic beryllium. It occurs in pegmatite dykes, mainly in the form of disseminated crystals, and most of the comparatively small tonnage produced is a by-product from the mining of such dykes for their feldspar, lithium minerals, or mica. World output is relatively small and comes mostly from the United States, India, Argentina, Brazil, and South Africa. Known world reserves, however, are believed to be capable of meeting a considerable increase in the demand.

"Known occurrences of beryl in Canada include a deposit in Lyndoch township, Renfrew county, Ontario, and several scattered occurrences in southeastern Manitoba, Ontario, Quebec, and the Northwest Territories.

"There have been no recorded sales of beryl from Canadian sources. The only known shipment consisted of a few tons taken from the Lyndoch deposit about ten years ago and shipped for experimental purposes. No records of imports of beryllium or its compounds are available, and no beryl is known to be used or required for any purpose in Canada.

"The leading users of beryl on the American continent are Beryllium Corporation of Pennsylvania, Temple (Reading), Pennsylvania, and Brush Beryllium Company, 3714 Chester Avenue, Cleveland, Ohio, both of which are engaged in treating the mineral for the production of metal, alloys, and compounds. Beryllium oxide also is produced by Clifton Products Incorporated, Painesville, Ohio; and a plant for the manufacture of oxide and carbonate was being installed in 1941 at Harbor City, California, by the Calloy Company.

"Prior to 1941, nominal American quotations for beryl had remained steady at \$30 to \$35 per short ton, f.o.b. mines, or \$40 to \$45 at consumption point, for 10 to 12 per cent BeO material, though actual sales under contract averaged somewhat higher. Quotations advanced through 1941 to \$52 and \$55 for the above grades, with actual sales reported at \$60 to \$72 in the latter part of the year. The upward trend continued during 1942 and in the latter part of the year the price was stabilized by the U.S. Government at \$8.33 per unit of contained BeO, equivalent to \$83 and \$100 per ton for 10 per cent and 12 per cent grades, respectively, this price being for purchases for Government account."—(Bureau of Mines, Ottawa.)

BISMUTH

Production of bismuth in Canada in 1942 totalled 347,556 pounds valued at \$479,627. The greater part of this output originated in the silver-lead ores of British Columbia and the recovery of the metal from these ores was made in the Trail plants of the Consolidated Mining and Smelting Company of Canada, Limited. In addition to the British Columbia production, a relatively small quantity of bismuth was recovered in the form of a lead-silver-bismuth bullion made by the Deloro Smelting & Refining Company Limited from silver-cobalt ores mined in northern Ontario.

It is impossible to arrive at any actual figure for the world output of bismuth and according to "The Mineral Industry" the world total in 1940 was probably not far from the 1,500 metric tons estimated in 1939. Peru, Mexico, Roumania, Japan, Bolivia and Australia are among the more important bismuth producing countries. The occupation of Yugoslavia in 1941 gave Germany control of the by-product bismuth from the Trepcia mines.

Bismuth is used mostly in the manufacture of pharmaceutical products. A much larger portion than formerly is now used in the making of so-called fusible or low-melting alloys. Fusible bismuth alloys usually include lead, tin, cadmium, mercury, or antimony. An alloy of bismuth, lead, tin, and antimony has been introduced for use in mounting dies and punches. The Ekko process, for electroforming with iron, has provided an outlet for bismuth in the form of "cerrobaze", a nonshrinking bismuth-lead (Bi-Pb) alloy. One application of the Ekko process is the production of dies or moulds from which a photographic likeness can be transferred to iron. Although many applications of bismuth, introduced in recent years, have increased the demand for this metal, potential supplies have greatly exceeded the present demand. The war has restricted international trade in bismuth and encouraged the use of substitutes. The demand for bismuth increased recently owing to its greater use in metallurgical and pharmaceutical applications. Alloys containing bismuth find use to a greater extent in the aircraft, machine tool, munitions and other industries.

The price of bismuth at New York remained fixed at \$1.25 a pound throughout 1941 and 1942. For several years the United States price has been maintained at a little below the European parity, plus duty of 7½ per cent ad valorem, chargeable upon imports into the United States. For several years the price has been well controlled.

Table 102.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1941 and 1942

Item	1941		1942	
	Pounds	\$	Pounds	\$
Bismuth metal.....	30,993	38,188	24,420	30,534
Bismuth salts.....	14,159	29,251	18,153	35,793

Canadian white metal alloy foundries consumed approximately 25,979 pounds of bismuth metal in 1942 and 1,810 pounds in 1941.

BORON

According to the United States Bureau of Mines, boron alloys are supplied by United States manufacturers, small quantities being used in the non-ferrous metals industries and in steel making. In cast iron, boron opposes graphitization on solidification and exerts an energetic whitening effect, producing a hard strong iron but reducing malleability. Recently boron has been found to be one of the so-called minor elements that stimulate plant growth and inhibit the development of certain plant diseases.

Boron carbide, boron carbide shapes and calcium boride are now produced in Canada.

World reserves of boron minerals are abundant, but known sources are confined to a few countries, chiefly the United States, Chile, Argentina, Peru, Italy and Turkey, although borax also has been reported in Tibet, Persia, India and Ceylon.

A maximum price of \$41.50 per ton for borax was set by the United States Price Administration in 1941.

CADMIUM

Cadmium production in Canada represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1935 came entirely from the treatment of zinc-bearing ores at Trail, B.C. by the Consolidated Mining & Smelting Company of Canada, Limited. The commercial production of the metal from the copper-gold-silver-zinc ores of the Flin Flon mine was commenced in Manitoba for the first time in 1936.

Cadmium is consumed largely in the manufacture of alloys and for plating, also in the making of such pigments as cadmium lithopone, cadmium yellows, etc. A relatively large quantity of the metal is used in the production of bearing metals for high-speed internal combustion engines. It was reported after the outbreak of war in September, 1939, that both the demand and market price of cadmium showed a decided increase. "Metal and Mineral Markets", New York, quoted cadmium, June, 1942, per pound, commercial stocks, wholesale quantities, 90 cents.

Canadian production of cadmium in 1942 totalled 1,148,963 pounds valued at \$1,355,776 compared with 1,251,291 pounds worth \$1,469,016 in 1941. Data relating to world production of cadmium have not been complete since 1938, for which year the American Bureau of Metal Statistics estimated a world output of 8,666,422 pounds. The United States is by far the greatest producer of cadmium; other important producers at the outbreak of war included Germany, France, Norway, Poland, Mexico, South West Africa, Russia, Belgium and Australia. "Mineral Industry" reported that almost one-third of the normal cadmium production of the world was now in German hands, but this does not necessarily mean that Germany is now well supplied with cadmium, for all the countries concerned except Germany and Poland depended almost entirely on imported ores which are no longer available. Cadmium is recovered as a by-product in the electrolytic refining of zinc and in the manufacture of lithopone, and therefore the volume of its output fluctuates with the production of these materials.

Table 103.—Cadmium Consumed by Specified Canadian Industries, 1940-1942
(Pounds)

Industry	1940	1941	1942
White metal alloys.....	121,008	243,717	347,725
Steel foundries.....	6,000	32,000	18,000
Iron foundries.....	9,528	12,000	34,000
Non-ferrous smelters.....			2,000
Other industries.....	5,433	11,000	12,000
Total Accounted for.....	142,019	298,717	413,725

CALCIUM

There is no commercial production of calcium metal in Canada and data relating to possible imports of metallic calcium into the Dominion are not published. Metallic calcium was produced almost exclusively abroad before the war, chiefly in France. It is now made in the United States, which is the leading consumer.

Metallic calcium was placed under allocation by the United States War Production Board through issuance, on April 1, 1943, of General Preference Order M-303. The metal is used exclusively in metallurgy, including production of magnesium for casting, stainless steel alloys, zirconium, and various special alloys. Distributors in the United States quoted the metal in April, 1943 at \$1.25 a pound, ton lots.

CERIUM

"Cerium is obtained from monazite, a monoclinic phosphate of cerium metals, containing about 32 per cent cerium oxide (Ce_2O_3) and up to 18 per cent thoria (ThO_2). Monazite is distributed widely in igneous rocks throughout the world, especially in gneisses that have been intruded by pegmatites, but usually in forms only a small fraction of one per cent of the containing rock, and only the natural concentrations in stream gravels and beach sands have paid for exploration. The leading commercial sources of monazite sands are beach deposits in Brazil and India. In the United States there are commercial deposits in Carolina, Florida, and Idaho, and known occurrences in many other states. There are no known commercial deposits in Canada; there are a few known occurrences of monazite in Nova Scotia, Quebec, and British Columbia. It is usually found as small crystals in granites and pegmatites in the Canadian Shield. Small quantities occur in association with the black sands of the Quesnel River, Lillooet district, British Columbia. World production of monazite is approximately 5,000 tons a year.

"Cerium is usually regarded as belonging to the general group of "rare earths", as it invariably occurs in nature associated with the other members (15 in all) of the group, and is very similar to the other rare-earth elements in many of its chemical properties.

"Formerly the only commercial constituent of monazite was thoria, which was used in gas mantles, and monazite is still marketed on the basis of its thoria content, although commercial interest now centers on its content of ceria (Ce_2O_3) and other rare-earth oxides. Probably 50 per cent of monazite derivatives are consumed, chiefly as fluorides, in the cores of arc carbons to increase lighting intensity in searchlights, motion-picture projectors, and therapeutic lamps. About 25 per cent of the consumption of monazite derivatives is used in pyrophoric alloys or ferroceriums for use in sparking flints for lighters and the remainder is distributed among a large variety of uses, principally for making optical glassware.

"Nominal prices for monazite as given by Metal and Mineral Markets, New York, remained at \$60 per short ton, 8 per cent minimum thoria, throughout 1942. Published quotations are not available for most of the rare-earth products, although prices for small lots may be obtained on request from mineral dealers and chemical manufacturers. Prior to the war the leading producers of rare-earth products were located in Berlin, London, and Paris, for Europe, and Chicago for the United States.

"In Canada, Shawinigan Chemicals, Limited, Shawinigan Falls, Quebec, has, since 1940, been producing cerium products from imported cerium chloride. The output is sold to Cerium Company, Limited of Montreal, for the manufacture of sparking flints."—(Bureau of Mines, Ottawa.).

CHROMITE

"Pure chromite (FeCr_2O_3) contains 68 per cent chromic oxide, but in nature it always contains besides iron, varying amounts of magnesia and alumina. It is a heavy, almost black, lustrous and brittle mineral and the ore usually occurs in dunite bands in serpentine rocks. Fresh dunite is a fine-grained dark grey-green olivine rock. Chromite is distinguished in the field from other black minerals of similar appearance by its chocolate-brown powder or streak when struck or scratched with a hammer.

"Shipments were made by four producers operating in the Eastern Townships of Quebec, the chief of which was Chromite Limited at St. Cyr, 30 miles north of Sherbrooke; other shippers were Orel Pare, who worked the old Montreal pit, Coleraine township, range 11, lot 25, under contract for Union Carbide (U.S.A.); Bruce Fletcher and later Orford Mining Company, from a deposit northwest of Sherbrooke, and W. Roberge from the old Hall mine (Thetford quarry), 7 miles southeast of Black Lake. Canadian production of chromite in 1942 totalled 11,456 tons valued at \$343,568.

"The two outstanding developments in Quebec during the year were the operations at Chromeraine on the old Reed-Belanger properties near Black Lake and the full-scale production by Chromite Limited near St. Cyr station (C.N.R.) in Cleveland township, range X, lots 7 and 8. During the last war the St. Cyr deposit, 5 miles east of Richmond, was known as the Sterrett mine and was opened by surface pits and underground workings for a length of 1,400 feet, and about 15,000 tons of ore were sold as crude or concentrate. Because of the favourable indications on the second level, a 100-ton mill was erected in the fall of 1941 and production was started early in 1942 and later the mill was increased to 150 tons. At the present output rate it is expected that before the end of 1943 the output during the last war will be exceeded.

"In the Black Lake area, Wartime Metals Corporation extensively diamond drilled and investigated the underground workings of the Reed-Belanger deposit in Coleraine township, range X, lot 19, from which about 100,000 tons of concentrate and crude ore were sold during the last war. Over a million tons of milling grade ore, with some high-grade shoots were indicated. Buildings and a 600-ton a day concentrator were erected, and production of concentrates is expected about the middle of May, 1943. The property is now known as Chromeraine. Wartime Metals Corporation also holds the old Provincial mine, half a mile to the north. This property was examined and mapped by geologists of the Federal Department of Mines in 1942 and diamond drilling was recommended.

"Many chromite deposits are known in the Black Lake-Thetford area and shipments to the Chromeraine mill are expected from a number of small and partly worked deposits. Several of these were prospected in 1942 and on some of them milling grade ore has been stockpiled.

"In the outlying districts, the Orford Mining Company operating with Dominion Government assistance, took over, late in the summer, the H. Bruce Fletcher deposits in Orford township, range XII, lot 7, about 15 miles northwest of Sherbrooke and worked No. 4 pit, which is 100 feet deep. A tunnel was driven under the pit and over a thousand tons of crude ore were shipped, but operations ceased late in the fall. In the Gaspé peninsula, Chromium Mining and Smelting Company is prospecting and diamond drilling chromite deposits in Weir township about 15 miles north of Port Daniel on the south Gaspé shore and also about 70 miles to the northwest in the Mount Albert district, Courcellette township, in north-central Gaspé. In the former, large boulders of chromite have been found and search for the ore in place is continuing. At Mount Albert small areas of high-grade lenses were discovered near the top of the mountain. Some work was done by Alchrome Prospecting Syndicate on a deposit in Awantjish township, range IV, lot 12, a few miles west of Lake Metapedia on north-central Gaspé.

"In Ontario, Donaldson Chromium Prospecting Syndicate did some work on the serpentine zone in Rheame township, concession VI, lot 10, about 11 miles southeast of Cochrane, where small segregations of low-grade ore, high in iron, were prospected by pits, trenching, and diamond drilling. A deposit west of Shebandowan Lake, 55 miles west of Port Arthur, was sampled and diamond drilled but as samples and mill tests gave low results with high iron content further prospecting was not recommended.

"In Manitoba, considerable interest has been aroused by the discovery by geologists of the Federal Department of Mines and the University of Manitoba, of large chromite deposits north of the Bird River about 20 miles from the railway at Pointe du Bois in the southeastern part of the province. In July 1942, the recognition of chromite in the gabbro and peridotite on the Page claim (being drilled for copper-nickel) suggested its occurrence in other areas of similar rocks, which was later confirmed. Many claims have been staked or acquired and are being drilled and prospected by Hudson Bay Exploration and Development, God's Lake Gold, Gunnar Gold, Central Manitoba, and others. The chromite occurs in alternate narrow bands of high- and low-grade ore. The main zone averages 7 feet in width and occurs in several separated groups, some of which have been traced for over 2,000 feet. The run-of-mine ore ranges

between 16 and 20 per cent Cr_2O_3 , but is complex and high in iron. Several car lots were sent to the Bureau of Mines Laboratories, Ottawa, recently for concentration tests. Some difference was found in the character of the ores from the God's Lake and the Hudson Bay claims, the latter yielding a slightly better concentrate, but both contained a high proportion of iron, the best chrome-iron ratio being about 1.2 to 1. About a car lot of mixed concentrate from both properties was shipped to Sault Ste. Marie for test. Metallurgical research is being conducted at Ottawa to reduce the content of iron, but owing to its peculiar and intimate association with the chromite, satisfactory results are difficult to obtain at a reasonable cost.

"In British Columbia, a number of chromite deposits were examined by geologists of the Federal and Provincial Departments of Mines. A few were prospected but no shipments were made and substantial production is not likely from any.

"Until recently, metallurgical chromite had to contain a minimum of 48 per cent Cr_2O_3 and a chrome-iron ratio of not less than 3 to 1. Basic ceiling prices are for ores of the above grade and ratio, but because of the present emergency, ores as low as 40 per cent Cr_2O_3 and 2-1 ratio are acceptable at lower prices. When possible, lower grade ores are mixed with those of the highest grade, the proportion depending upon whether the ferrochrome produced is to be used for low- or for high-carbon steels. The maximum allowance for sulphur is 0.5 per cent and for phosphorus 0.2 per cent. Although lump ores are preferred, fines and concentrates are used in quantity; in some instances they are briquetted before use. The low iron content of the ore or concentrate is of the utmost importance.

"The principal Canadian buyers of chromite for metallurgical use are: Chromium Mining and Smelting Corporation, Sault Ste. Marie, Ontario, and Electro-Metallurgical Company of Canada, Welland, Ontario. The only important purchaser of refractory ore is Canadian Refractories Limited, Canada Cement Building, Montreal, Quebec. The types and grades of ore acceptable to these buyers are indicated under "Specifications".

"Canadian prices for high-grade ores are based upon the United States ceiling price, which is \$43.50 per long ton at seaboard for ore containing 48 per cent Cr_2O_3 with a chromium-iron ratio of 3 to 1; plus or minus 90 cents per long ton unit of 22.4 pounds of contained Cr_2O_3 above or below 48 per cent; plus or minus \$1.25 for each 0.1 chromium-iron ratio above or below 3 to 1, the limits being 3.5 to 1 and 2 to 1.

"The price at a Canadian mine at Black Lake in the Eastern Townships of Quebec would, for example, approximate this basic ceiling price; plus freight of \$2.28 from seaboard to Niagara Falls (near a Canadian consuming centre); plus exchange at 11 per cent to convert into Canadian funds; less \$5.12 freight from Black Lake to Niagara Falls. For a 46 per cent Cr_2O_3 ore with Cr-Fe ratio of 2.8 to 1, this price per long ton at Black Lake would thus amount to about \$43.50, less penalties of \$4.30, plus freight of \$2.28, plus \$4.56 exchange, less \$5.12 freight, or to about \$40.83 in Canadian funds."—(Bureau of Mines, Ottawa.)

Prices of other grade ores can be obtained from the Metals Controller, Ottawa.

Table 104.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1941 and 1942

Industry	Item	1941		1942	
		Pounds	\$	Pounds	\$
Ingots and castings.....	Chrome ore.....	1,248,000	30,619	2,464,000	58,095
Ingots and castings.....	Ferrochrome.....	6,878,000	690,600	11,262,000	1,445,089
Paints, pigments and varnishes.....	Chrome colours.....	2,370,872	464,089	2,669,978	551,855
Paints, pigments and varnishes.....	Sodium bichromate.....	887,797	85,329	1,015,065	105,731
Leather tanning.....	Sodium bichromate.....	1,905,201	179,306	2,107,737	203,305
Glass manufacture.....	Chromite.....	4,000	204	16,000	460

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. Chromite is also employed in Canada in the manufacture of refractories.

Table 105.—Chromite Mining in Canada, 1942
(all in Province of Quebec)

Active firms.....	No.	14
Capital employed.....	\$	380,027
Employees—Salaried.....	No.	45
Wage-earners.....	No.	286
Total.....	No.	331
Salaries and wages—		
Salaries.....	\$	57,926
Wages.....	\$	354,529
Total.....	\$	412,455
Gross value of production.....	\$	343,568
Fuel and electricity used.....	\$	34,567
Process supplies used.....	\$	116,725
Freight.....	\$	17,945
Net value.....	\$	174,331

NOTE.—In addition, exploratory work, including diamond drilling, was conducted in 1942 on chromite deposits located in south-eastern Manitoba, but no data are available.

INDIUM

"Many zinc ores contain indium, which is frequently associated with gallium. Indium also occurs in tin and tungsten ores and in some iron and manganese ores. Indium production in Canada was reported for the first time in 1942. It is being recovered in small quantities at Trail, British Columbia, from treatment of the residues obtained at the zinc refinery of Consolidated Mining and Smelting Company.

"Refined indium has a silvery-white colour somewhat resembling that of platinum. It is ductile and slightly heavier than zinc. It has a low melting point (155°C.) and a relatively high boiling point (1450° C.).

"World production is still relatively small. Indium is being produced commercially in the United States, Germany, Belgium, and possibly in Japan and Russia.

"In the United States indium is now recovered as a by-product of zinc and lead operations by American Metal Company, American Smelting and Refining Company, Anaconda Copper Mining Company, and National Zinc Company.

"Indium is used for plating and as an alloy with other metals. It is desposited on and alloyed with cadmium-nickel and copper-lead on bearings for aeroplanes, automobiles, etc., and resists corrosive action of lubricants containing organic acids. Coatings of indium-alloys appear to have a diversity of uses. They are easily polished and burnished. Indium is alloyed with gold and silver and with various base metals. It is used in dental alloys and in making low melting alloys. Augmented production of engine bearings and war restrictions on ordinary plating metals have stimulated interest in indium during the past two years.

"The price of metallic indium was reduced in December 1940 from \$15 to \$12.50 a troy ounce, at which price it remained throughout 1941 and 1942."—(Bureau of Mines, Ottawa.).

Canadian production of indium in 1942 totalled 471 troy ounces valued at \$4,710.

IRON ORE

"Deposits of iron ore in Canada are many and widespread and include hematite, siderite, magnetite, bog iron, and magnetic sand. Because of the availability at low cost of higher grade ores in the Lake Superior iron ranges of the United States and in Newfoundland, no iron ore from domestic sources was produced in Canada from 1923 until 1939. Production of iron ore in Canada in 1942 totalled 545,306 short tons valued at \$1,517,077.

"Dominion Steel and Coal Corporation, Limited, with plants at Sydney, Nova Scotia, obtains its iron ore from its own mines at Wabana, Newfoundland. Steel Company of Canada, Limited, at Hamilton, Ontario, and Canadian Furnace, Limited, at Port Colborne, Ontario, obtain their iron ore supplies from the Lake Superior region of the United States. Algoma Steel Corporation obtains most of its requirements from the United States and the remainder from the New Helen mine.

"In Ontario, Algoma Ore Properties, Limited, a wholly owned subsidiary of Algoma Steel Corporation, Limited, encouraged by the bounty of two cents per iron unit provided by the Ontario Government, began in 1937 development work at its New Helen mine in the Michipicoten area, Ontario, and the first sinter was produced in July, 1939. Operations during the last two years consisted mainly in open cut mining.

"The New Helen deposit is estimated by the company to contain at least 100,000,000 tons of siderite or carbonate ore, averaging about 35 per cent iron, and, to fit it for commercial use in blast furnaces, a sintering plant capable of treating 3,000 tons of ore a day was built, the sinter produced approximating the following analysis:

	%		%
Iron.....	53.40	Alumina.....	2.06
Phosphorus.....	0.03	Lime.....	3.95
Silica.....	7.00	Magnesia.....	7.50
Manganese.....	3.00	Sulphur.....	0.035

"The total shipments of sintered ore in 1942 were 481,800 tons. It was shipped via Michipicoten Harbour, 8 miles from the sintering plant, to the company's blast furnaces at Sault Ste. Marie, Ontario, and to the United States ports on the Lower Lakes for use in United States blast furnaces. The manganese content is of special interest to users.

"Exploratory work on the hematite property of Steep Rock Iron Mines Limited situated east of Atikokan, and about 135 miles west of Port Arthur, Ontario, indicates that the deposits which were discovered in the winter of 1937-38 under the bed of Steep Rock Lake by diamond drilling through the ice, are large and high in grade. The size of the hematite bodies can be gauged from what has been reported, namely, that the probable average widths of A, B, and C bodies are 205, 135, and 200 feet respectively, with explored lengths of over 3,000 feet in the case of A, which is still open at one end, and of 5,000 and 800 feet for B and C, each of which is open at both ends. Under the A orebody the greatest depth at which the ore has been found in a borehole is 1,400 feet below the surface of Steep Rock Lake, or 1,035 feet below the ledge; under the B zone ore was encountered 700 feet below lake level. High-grade ore occurs within these deposits and presumably makes up a considerable, but as yet very incompletely defined part of them.

"A shaft on the shore west of orebody "A" was sunk during the winter of 1939-40 to a depth of over 800 feet, and a crosscut was then driven on the 800-foot horizon toward the orebody. Water difficulties were so serious that the crosscut could not be completed, and it became evident that drainage of the lake was necessary to mine the ore. The company's development program includes the diversion of the Seine River, which now flows through the lake, and the pumping out of the lake itself for open-pit mining of the large orebodies already indicated. This deposit appears to be one of the most important mineral discoveries made in Canada in recent years. During the past winter churn-drilling operations were carried on through the ice to determine the continuity of the orebodies in depth. These holes showed similar high-grade ore as outlined by the earlier diamond drilling. Detailed surveys of the route of the diversion have been made and negotiations are under way toward the financing of the diversion of the river, the drainage of the lake, and to bring the property into production.

"Michipicoten Iron Mines Ltd. was formed in 1943 to take over the iron properties owned jointly by Sherritt Gordon Mines Ltd. and Frobisher Exploration Co. Ltd. (a subsidiary of Ventures Limited). These properties, which consist of the Josephine, Ruth, and Lucy mines are about 20 miles from Michipicoten Harbour, Algoma district. Construction work was started at the Josephine mine in the fall of 1941, a transmission line was built to connect with the power line at Hawk Junction and the necessary electrically driven plant for development operations was installed. Shaft sinking was started February, 1942 and completed to a depth of 1,055 feet early in September. The drainage of Parks Lake was undertaken and by the end of October the main basin of the lake under which the orebody is located was dewatered. Some experimental shipments of lump ore have been made for test purposes.

"The highest grade ore known is at the Josephine property, while large but lower grade ore deposits exist at the Ruth property about two miles away. The Lucy property has not yet been drilled. The Josephine mine is estimated to contain 1,271,000 tons of hematite averaging 51.3 per cent iron and 21 per cent silica, down to the 6th level. At the Ruth property drilling carried out since January 1942 shows an estimate of 11,200,000 tons of siderite, averaging 34.5 per cent iron. A pilot-plant has been in operation since the summer of 1942 for testing purposes. Consideration is being given to the erection, possibly in 1943, of the necessary mining, milling, and sintering plants for the production of about 500 tons of sinter a day.

"During the past year Frobisher Exploration Company, Ltd., an exploration subsidiary of Ventures Limited and associated companies, continued investigation of Bessemer, Childs, and Rankin magnetite deposits in Mayo township, Hastings county. Extensive underground sampling and diamond drilling were carried out at the Bessemer mine, and the program of surface drilling on the Bessemer commenced in 1941 was continued. At the Radenhurst-Caldwell magnetite property near Flower Station, in Levant township, Lanark county, a program of shallow diamond drilling was carried out in 1942. This exploration indicated a substantial tonnage of low-grade ore and further drilling is planned in 1943. Large-scale magnetic concentration tests on the Bessemer ore were continued, and small-scale testing on the Radenhurst-Caldwell ore was commenced, at the Bureau of Mines Laboratory in Ottawa.

"Extensive surveys and exploration work have been carried on by Labrador Mining and Exploration Company of Montreal, near Sawyer Lake and vicinity, along the Quebec-Labrador boundary line. The company reports that six deposits of iron ore were discovered during the short summer field seasons of 1936 to 1939 inclusive. The principal deposit located at Sawyer Lake, in the Newfoundland Labrador Concession, about 280 miles north of Seven Islands in the Gulf of St. Lawrence, is estimated by the Company to contain 2,200,000 tons of hematite ore (averaging 65% iron) per 100 feet of depth. The phosphorus content is under 0.04 per cent. Four other deposits are of good grade, and one of them is rich in manganese. The total possible reserve in these four deposits is estimated by the company at 70,000,000 tons to a depth of 1,000 feet. The other deposit is high in silica, and is believed to represent a large tonnage. Field work on this deposit was carried on in 1942 under the direction of Hollinger Consolidated Gold Mines, Limited which has acquired a controlling interest in Labrador Mining and Exploration Company. Geological and exploration work were also undertaken on the Concession in a contiguous area in Quebec, which area embraces a total of approximately 20,000 square miles. The field work of 1942 by Hollinger confirmed the results of the work of earlier years. The exploitation of these deposits would necessitate the construction of a railway line from the St. Lawrence River at Seven Islands, which port is open to navigation throughout the year.

"In British Columbia, the report on the proposed iron and steel works by Arthur G. McKee and Company of Cleveland, Ohio, for the British Columbia Department of Mines was made public on February 26, 1942. The general plan involves the annual production of 75,000 tons of finished steel products. The proposed site is at Union Bay, on the east coast of Vancouver Island. The province has many deposits of magnetite and a few of hematite and limonite. Three deposits, owing to their proximity to Union Bay, have been selected for consideration; Zeballos, on the northwest coast of Vancouver Island, with 500,000 tons of magnetite averaging 68½ per cent iron with low manganese and no undesirable elements; Iron Hill, south of Campbell River, on the east coast of Vancouver Island, with 1,000,000 tons of magnetite ore available; Texada Island, within 20 miles of Union Bay, with several deposits of good grade ore. The proposed site is adjacent to coking coal and limestone supplies.

"Bounties on the production of iron ore are offered by the provinces of Quebec, Ontario, and British Columbia. In Quebec, the premium is at the rate of four-fifths of one cent for each unit (22 lb.) of iron metal contained in every ton of iron ore. In Ontario, the bounty is 2 cents per unit of metallic iron in the long ton of low-grade iron ore beneficiated in Ontario so as to be suitable for use in the blast furnace, or on natural ore of commercial quality smelted in Canada. In British Columbia, the bounty paid must not exceed \$3.00 a ton on the proportion of pig iron produced from ore mined in the province, and must not exceed \$1.50 a short ton on the proportion of pig iron produced from ore mined outside the province. A bounty not to exceed \$1.00 a short ton is also offered on steel shapes of commercial utility manufactured in British Columbia."—(Bureau of Mines, Ottawa.).

During 1942 there were 187 short tons of magnetite valued at \$935 shipped from a deposit located near St. Jerome in the province of Quebec. The mineral was extracted by Laurentide Mining Reg.

There are no official Canadian price quotations for iron ore. Prices f.o.b. Lake Erie ports, per long ton for Lake Superior, U.S.A., iron ore, 51½ per cent iron ore are: Messabi, Non-Bessemer—\$4.45, Bessemer—\$4.60; Old Range, Non-Bessemer—\$4.60, Bessemer—\$4.75. The price of Brazilian ore, f.a.s. Brazilian ports, 68 per cent iron, is 7 cents per long ton unit or \$4.76 a long ton.

Table 106.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1931-1942

Year	To Nova Scotia	To United States	To Europe	Total Shipments
	(Short tons)			
1931.....	234,148	25,670	530,079	789,897
1932*.....			166,303	166,303
1933.....			254,383	254,383
1934*.....	346,178		344,769	690,947
1935.....	611,581		81,123	692,704
1936.....	527,540	12,656	252,676	792,872
1937.....	702,714	50,490	1,242,088	1,995,292
1938.....	555,348		1,305,068	1,860,416
1939.....	576,198	16,184	980,098	1,572,480
1940.....	762,310	26,118	789,578	1,578,006
1941.....	943,643	63,869	316,530	1,324,042
1942.....	735,324†		234,483	969,807

* Shipments to Europe in 1930, 1932 and 1934 were to Germany only, while from 1935 to 1938 shipments went to both Germany and Great Britain. Shipments to Germany in 1938 totalled 1,256,230 short tons, and in 1939, 768,743 tons. In 1940 and following years, European shipments went to Great Britain.

† Includes 41,203 tons lost by enemy action.

Table 107.—Iron Ore Mining in Canada, 1942 (*)

	Quebe	Ontario	Canada
Active firms.....No.	3	4	7
Capital.....\$	105,927	2,402,723	2,508,650
Employees—On salary.....No.	7	35	42
Wage-earners.....No.	5	313	318
Total.....No.	12	348	360
Salaries and Wages—Salaries.....\$	3,699	89,785	93,484
Wages.....\$	5,140	577,495	582,635
Total.....\$	8,839	667,280	676,119
Gross value of production.....\$	935	1,516,142	1,517,077
Fuel and electricity used.....\$		301,778	301,778
Process supplies used.....\$		347,690	347,690
Freight and treatment charges.....\$		236,307	236,307
Net value.....\$	935	630,367	631,302

* Does not include data relating to titaniferous iron ores.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the Primary Iron and Steel Industry include data for all establishments in Canada which were engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and steel castings, (d) hot rolled iron and steel products, (e) cold rolled or cold drawn steel bars, strips and shapes. Forty-four firms were included in this industry in 1942 and reports were received for 61 different plants or departments, including 4 blast furnace departments, 4 ferro-alloy plants, 35 steel furnace divisions, and 18 rolling or drawing mills. Separate reports were received for blast furnace departments, for steel furnace divisions and for rolling mills even when all three were units of a single works.

Factory sales of pig iron, ferro-alloys, steel ingots and castings and finished rolled products were 41 per cent higher in 1942 than in 1941, the values being \$232,105,755 and \$164,566,392, respectively. Twenty-seven works in Ontario accounted for 69 per cent of the total for Canada or \$159,077,961; 6 plants in Nova Scotia accounted for 13 per cent or \$31,009,632; 16 plants in Quebec for 15 per cent or \$34,976,121, while the remaining \$7,042,041 or 3 per cent was accounted for by 4 plants in Manitoba, 5 in British Columbia and 3 in Alberta.

Fixed and working capital employed in this industry amounted to \$205,804,671, including \$122,624,037 for the value of land, buildings and plant equipment, \$45,440,893 for the value of raw and finished materials on hand and in process, and \$37,739,741 for operating capital, such as cash, bills and accounts receivable. For works in Ontario the capital was \$128,620,497; in Nova Scotia, \$44,723,425; in Quebec, \$28,499,707; in Manitoba, \$2,544,377; and in Alberta and British Columbia, \$1,416,665.

In 1942, an average of 33,245 people were employed in this industry, this being an increase of 40 per cent over the 1941 average of 23,735. About 1,655 persons worked in the blast furnace departments during the year, 11,894 in the steel furnaces, 17,410 in the rolling mills and 2,286 in ferro-alloy plants (exclusive of those producing ferro-alloys as a by-product). Fifty-five per cent of the employees or 18,147 worked in plants in Ontario, 6,679 in Quebec, 6,936 in Nova Scotia, 933 in Manitoba and 550 in Alberta and British Columbia.

Payments in salaries and wages during 1942 amounted to \$60,874,818, a gain of 35 per cent over the previous year's total of \$45,037,095. Salaries advanced to \$5,283,722 from \$4,163,580, and wages to \$55,591,096 from \$40,873,515.

Materials used in manufacturing processes cost \$110,551,516 in 1942 compared with \$78,824,366 in 1941, and the cost of fuel and electricity was \$18,734,178 against \$13,888,384, an increased expenditure of 40 per cent for materials and 35 per cent for fuel and power.

Pig Iron.—Output of 1,975,014 net tons of pig iron in 1942 was 29 per cent over the 1,528,053 tons reported for the previous year. Production of basic iron amounted to 1,646,001 tons or 83 per cent of the total; foundry iron amounted to 159,724 tons and malleable iron to 169,289 tons.

Producers' sales of pig iron totalled 387,997 tons at \$8,366,936 in 1942 compared with 338,066 tons at \$7,080,242 in 1941, a gain of 15 per cent in quantity and 18 per cent in value.

Charges to iron blast furnaces during the year included 3,383,439 tons of imported iron ore, 229,253 tons of Canadian ore, 1,795,875 tons of coke, 559,650 tons of imported limestone and 301,143 tons of Canadian limestone.

Imports of pig iron during the calendar year declined to 1,536 tons from 4,729 tons in 1941 and exports increased slightly to 427 tons from 380 tons.

Producers' stocks at the end of 1942 totalled 87,955 tons compared with 27,049 tons at the end of the previous year.

The apparent consumption of pig iron in Canada, as calculated by deducting the exports from the sum of the production and imports, and allowing for changes in producers' stocks, amounted to 1,915,217 tons in 1942 or 21 per cent more than in 1941 when the apparent domestic supply was 1,581,913 tons.

Producers of pig iron in Canada had 12 blast furnaces at the end of 1942 which could produce 2.1 million net tons a year if operated at rated capacity. Actual production of 1,975,014 net tons in 1942 showed an operating rate of about 94 per cent. Twelve furnaces were in blast during the year.

Ferro-Alloys.—Ferro-alloys were made in 1942 by 10 different concerns, 5 of which recovered ferro-silicon as a by-product in the manufacture of abrasives. Output of ferro-alloys in 1942 amounted to 209,017 net tons, a gain of 2 per cent over the 204,354 tons reported for 1941.

Altogether, ferro-silicon was made in nine different plants, spiegeleisen in two and ferrochrome in two. Other alloys produced by one firm only included ferromanganese, silicospiegel, silicomanganese, silicon metal, calcium silicon, calcium magnanese silicon, and ferrophosphorus.

Steel Ingots and Castings.—Steel production advanced 15 per cent to 3,109,851 tons in 1942 from 2,712,151 tons in 1941, the output of steel ingots going to 2,958,906 tons from 2,593,512 tons and steel castings to 150,945 tons from 118,639 tons. Factory sales of ingots and castings totalled 286,007 tons at \$38,014,454.

Thirty-five steel plants were in operation during the year. At the end of 1942, these plants had 123 furnaces, including 50 basic open hearth with an annual capacity of 2,777,300 net tons, 70 electric furnaces rated at 672,700 tons, and 3 converters at 8,200 tons. There were just 11 makers of steel ingots with capacity of 3,196,000 net tons per annum. The total annual steel capacity of all plants, including ingots and castings, was 3,458,200 tons at the year end.

Operating steel furnaces in 1942 used 1,615,396 net tons of pig iron, 1,826,911 tons of scrap iron or steel, 198,890 tons of ores, 243,608 tons of limestone, 101,641 tons of dolomite, 59,301 tons of lime, 99,384 tons of silica sand, 20,665 tons of magnesite and 22,101 tons of ferro-alloys.

Rolled and Drawn Steel.—In 1942 there were 15 mills occupied chiefly in hot rolling of steel products and 3 mills making only cold drawn and cold rolled shapes. Ten of these mills were in Ontario, 3 in Nova Scotia, 3 in Quebec, 1 in Manitoba and 1 in Alberta.

Rolling mill sales advanced 38 per cent to \$157,973,074 from \$114,056,762 in 1941. The main items sold during the year under review were: 474,312 tons of hot rolled bars at \$37,442,850; 385,314 tons of plates at \$30,095,754; 245,908 tons of sheets, hoops, bands and strips at \$18,398,051; 224,665 tons of rails and rail fastenings at \$10,628,149; 341,068 tons of semi-finished rolled forms, such as blooms, billets, etc., at \$16,343,624; 191,319 tons of structural shapes at \$10,540,658, and 105,475 tons of wire rods at \$4,347,189.

Table 108.—Provincial Distribution of Active Plants in the Primary Iron and Steel Industry, 1942

Province	Number of firms	Pig iron		Steel ingots and castings		Rolling and drawing mills	Ferro-alloys (a)
		Number of plants	Number of blast furnaces	Number of plants	Number of steel furnaces		
Nova Scotia.....	1	1	3	2	16	3	.....
Quebec.....	.....	.....	.....	12	26	3	1
Ontario.....	3	3	9	11	63	10	3
Manitoba.....	.....	.....	.....	3	5	1	.....
Alberta.....	.....	.....	.....	2	2	1	.....
British Columbia.....	.....	.....	.....	5	9	.....	.....
Canada.....	(b) 4	4	12	35	121	18	4

(a) Not including artificial abrasive plants which made ferrosilicon as a by-product.

(b) Some firms operate in more than one province.

Table 109.—Principal Statistics of the Primary Iron and Steel Industry, 1942

	No. of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
		\$		\$	\$	\$	\$
Nova Scotia.....	6	44,723,425	6,936	11,425,074	2,737,333	19,036,526	31,009,632
Quebec.....	16	28,499,707	6,679	12,101,633	3,361,715	15,524,075	34,976,121
Ontario.....	27	128,620,497	18,147	35,015,184	12,109,847	74,010,065	159,077,961
Manitoba.....	4	2,544,377	933	1,405,388	390,768	1,324,599	4,321,099
Alberta.....	3	954,842	274	434,276	73,589	393,726	1,411,967
British Columbia.....	5	461,823	276	493,263	60,926	262,525	1,308,975
Canada.....	61	205,804,671	33,245	60,874,818	18,734,178	110,551,516	232,105,755
Per cent change 1942 from 1941..	.....	+21.9	+40.1	+35.1	+34.9	+40.3	+41.4

NOTE.—Profits or losses cannot be calculated from above figures as data are not available for general expense items, such as, interest, rent, depreciation, taxes, insurance, advertising, etc.

DOMINION BUREAU OF STATISTICS

Table 110.—Production of Pig Iron and Sale by the Producers, 1942 and 1941

Grade	Delivered in molten condition	Machine cast	Total tonnage made	Sales	
				Quantity	Income from sales
	Net tons	Net tons	Net tons	Net tons	\$
1941					
Basic.....	1,137,869	134,302	1,272,171	70,221	1,389,979
Foundry.....	189	115,791	115,791	119,930	2,508,086
Malleable.....		139,902	140,091	147,915	3,182,177
Total.....	1,138,058	389,995	1,528,053	338,066	7,680,242
1942					
Basic.....	1,487,581	158,420	1,646,001	67,242	1,307,715
Foundry.....		159,724	159,724	157,991	3,439,405
Malleable.....		169,289	169,289	162,764	3,619,816
Total.....	1,487,581	487,433	1,975,014	387,997	8,366,936

NOTE.—Silvery pig iron has been included with ferro-alloys.

Table 111.—Materials Charged to Iron Blast Furnaces, 1941 and 1942

Material	1941		1942	
	Quantity	Cost at furnace	Quantity	Cost at furnace
	Net tons	\$	Net tons	\$
Iron ore—Imported (crude).....	2,542,826	9,238,799	3,383,439	13,726,346
Canadian (beneficiated).....	163,890	569,853	229,253	798,974
Canadian (crude).....	2,373	6,662		
Mill cinder, roll scale, fine dust, etc.....	136,698	314,248	177,343	386,730
Scrap (net charge).....	47,271	581,717	64,624	803,172
Limestone—				
From Canadian quarries.....	182,605	237,578	301,143	447,107
From foreign sources.....	465,960	551,773	559,650	799,302
Coke.....	1,362,530	7,203,703	1,795,875	13,402,828
Other materials.....		136,245		163,675
Total.....		18,840,578		30,528,134

Table 112.—Blast Furnaces in Canada, 1940-1942

Name of company	Location of plant	Number of stacks 1942	Total daily capacity (24 hours) 1942	Number of days in blast		
				1940	1941	1942
Dominion Steel and Coal Corporation, Ltd.	Sydney, N.S.....	1	392	357	365	365
		1	336	354	365	365
		1	616	358	298	365
Total.....		3	1,344			
Canadian Furnace Company, Limited.....	Port Colborne, Ont.....	1	466	*199	*279	304
		1	147			289
Total.....		2	613	199	279	593
The Steel Company of Canada, Limited...	Hamilton, Ont.....	1	364	366	365	365
		1	728	330	365	365
		1	980		110	365
Total.....		3	2,072			
Algoma Steel Corporation, Limited.....	Sault Ste. Marie, Ont.....	1	336	181	365	360
		1	336			184
		1	504	316	262	361
		1	616	366	365	349
Total.....		4	1,792			
Total for Canada.....		12	5,521			

* For making pig iron; ferro-alloys also made in this furnace.

Table 113.—Production of Ferro-Alloys, 1928-1942

Year	Net tons	Year	Net tons
1928.....	50,223	1936.....	85,438
1929.....	99,810	1937.....	91,921
1930.....	73,050	1938.....	62,637
1931.....	52,376	1939.....	85,540
1932.....	18,100	1940.....	149,394
1933.....	33,749	1941.....	198,364
1934.....	35,751	1942.....	199,419
1935.....	63,410		

Table 114.—Production of Steel Ingots and Steel Castings, by Grades, 1938-1942
(Net tons)

Year	Steel ingots		Steel castings			Total steel ingots castings
	Open hearth	Electric	Open hearth	Converter	Electric	
1938.....	1,172,867	62,598	17,388	850	40,109	1,293,812
1939.....	1,410,339	79,718	17,473	934	42,590	1,551,054
1940.....	2,041,947	135,633	21,085	2,268	52,786	2,233,769
1941.....	2,394,098	199,414	29,401	3,371	85,867	2,712,151
1942.....	2,623,853	335,053	26,627	6,515	117,803	3,109,851

Table 115.—Materials Used in Steel Furnaces, 1941 and 1942*

Material	1941		1942	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Net tons	\$	Net tons	\$
Pig iron—Own make.....	1,525,853		1,261,774	
Purchased.....	89,543	2,039,095	78,667	1,843,144
Scrap iron or steel—Own make.....	864,537		698,761	
Purchased.....	962,374	21,377,022	900,363	18,708,469
Spiegeleisen.....	2,911	153,054	5,316	365,656
Silico-spiegeleisen.....	439	51,827	9	2,120
Ferrovanadium.....	203	524,007	182	438,639
Ferromanganese.....	19,190	2,484,783	21,250	1,811,031
Silicomanganese.....	8,065	918,774	4,518	445,197
Ferrosilicon.....	12,150	841,900	14,836	616,954
Ferrochrome, high carbon.....	3,666	724,819	1,692	210,621
low carbon.....	1,965	720,270	1,747	479,979
Ferromolybdenum.....	150	223,233	55	78,504
Ferrophosphorus.....	290	25,826	745	63,309
Ferroselenium.....	5	10,323	2	3,063
Ferrotitanium.....	439	66,555	181	52,128
Ferrotungsten.....	646	1,440,141	482	1,003,314
Ferrozirconium.....	51	7,337	40	1,647
Calcium silicon.....	421	135,680	380	110,503
Calcium manganese silicon.....	289	93,191	114	40,312
Other ferro-alloys.....	134	238,301	80	162,127
Aluminium ingots.....	807	285,025	638	261,350
Copper ingots.....	39	10,190	108	23,855
Nickel.....	3,392	2,025,604	2,348	1,225,715
Other metals.....		132,736		83,023
Ore, iron, crude.....	98,986	616,617	148,807	1,792,029
Ore, iron, calcined, roasted or treated.....	98,156	1,757,431	5,778	21,833
Ore, manganese.....	32	1,600	64	3,316
Ore, chrome.....	1,232	58,095	624	30,619
Bentonite.....	3,382	101,211	1,939	62,105
Coal, anthracite.....	755	8,055	587	5,946
bituminous.....	219	1,916	574	4,733
Coke.....	6,113 (a)	74,555	5,053	71,074
Charcoal.....	224	10,333	58	2,349
Dolomite, crude.....	79,091	225,393	71,087	159,037
calcined.....	22,550	179,427	21,608	160,602
Fluorspar.....	20,133	562,480	17,054	366,701
Lime.....	23,075	315,470	40,799	370,545
Limestone, Canadian.....	120,573 (a)	239,838	67,837	108,124
Imported.....	123,035	128,605	134,772	158,218
Magnesite.....	20,665	786,321	18,127	682,742
Electrodes.....		989,222		489,593
Silica sand.....	99,384	712,516	67,099	469,874
Other foundry sand.....	35,340	105,042		114,026
Firebrick, fireclay and other refractories.....		2,469,239		1,862,876
Calcium molybdate and molybdenum oxide briquettes.....		1,167,579		525,671
All other materials.....		3,570,856		1,951,951
Total Value of Metals, Ores and Other Materials Used.....		48,611,494		37,444,624

(a) In addition 706 tons of coke and 36,226 tons of limestone of the company's own production were used.

Table 116.—Summary of Steel Furnace Capacity in Canada, December 31, 1942

Type of furnace	Number of furnaces at end of year	Total rated annual capacity
		Net tons
Basic open hearth.....	33	2,018,300
Electric.....	42	432,281
Converter.....	1	4,800
Total.....	76	2,455,381

LITHIUM

The first commercial shipment of Canadian lithium ore to be officially recorded was reported during 1937. This production came from deposits located at Bernic Lake, Manitoba, and was valued at \$1,694; the mineral was consigned to the United States for the manufacture of lithium compounds and possible lithium metal. No commercial shipments of lithium ores from Canadian mines were reported since 1937.

"Amblygonite, spodumene, and lepidolite are the chief lithium minerals of commerce and their ores usually contain respectively about 8, 6, and 4 per cent of lithium oxide. The known Canadian occurrences of these minerals of present economic interest are confined to Manitoba, where there is a considerable development of lithium-bearing pegmatites, notably in the Pointe du Bois area in the southeastern part of the Province. This district has furnished all of the small Canadian production, amounting to a few hundred tons, the material shipped being mainly spodumene. Lithium Corporation of Canada, 403 Avenue Building, Winnipeg, is the company that has been most actively interested in promoting development of deposits in the above section and it has carried out considerable work on its holdings, mainly on those at Bernic Lake.

"Lithium and its compounds have risen from a position of only minor importance a few years ago to one of considerable significance; war needs, and military uses in 1942 were greater than industrial requirements. The chloride is one of the most hygroscopic inorganic compounds known and is being used to an interesting extent as a drying agent in air-conditioning units.

"Lithium is the lightest of all the metals, having a specific gravity of only 0.53. A wide range of master alloys of lithium with calcium, silicon, brass, copper, manganese, zinc, lead, tin, magnesium and aluminium, has been developed in the United States. The lithium content of the base metal varieties ranges from 0.5 per cent to 10 per cent, and rises to as high as 50 per cent in the light calcium and silicon series.

"No plants for the chemical treatment of lithium ores exist in Canada and consequently, any production must find an export market. Most of the ore marketed prior to the war was treated by a few large chemical firms specializing in the business, the principal plants being in the United States, Great Britain, Germany, and France. Such firms usually purchase their requirements under individual contract and there is thus little in the way of an open market, price quotations given in trade journals being merely nominal. Some of the larger consumers own and operate their own mines.

"Figures of world production, exports and imports are not published. The United States, Southwest Africa, Sweden, Portugal, Spain, Germany, and Argentina are the chief producers, output in the United States being probably over 50 per cent of the total."—(Bureau of Mines, Ottawa.).

MAGNESIUM

Production of magnesium in Canada from domestic ores totalled 808,718 pounds valued at \$355,836 during 1942 compared with 10,905 pounds worth \$2,944 in 1941. The output in 1941 represented the metal in the form of powder produced by the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia; magnesite used in the production of this powder was obtained from deposits located at Marysville in the Fort Steele mining district. The production in 1941 was the first to be recorded in Canada since 1918.

The statistics of production for 1942 include the metal produced for the market at Trail, B.C. in the form of ingots and powder, and in magnesium chloride and alloys together with the metal produced in Ontario by the Dominion Magnesium Limited. The plant of Dominion Magnesium Limited, located near Renfrew, was brought into production in September, 1942. This company employs the ferrosilicon process and utilizes dolomite as the source of the metal; the rock is quarried in the immediate vicinity of the plant; calcined brucite rock shipped from Wakefield, Que. was employed at the commencement of operations.

National defence requirements, especially in the aircraft industry, have created a tremendous demand for magnesium metal. Complete data relating to world production of the metal are not available; in 1940 world output was estimated by "The Mineral Industry" at 44,000 short tons; eight nations producing in order of importance were Germany, United Kingdom, United States, U.S.S.R., Switzerland and Italy. In 1940 the only process commercially used in the United States for the production of magnesium metal involved the electrolysis of magnesium chloride in a fused salt bath, the raw material being derived from brine obtained from saline wells or sea water.

Late in 1941 it was reported that the Defence Plant Corporation, United States, had financed an expanded magnesium production totalling approximately 150,000 tons annually.

Magnesium was quoted in the United States, June, 1941: per pound ingots (4 x 16 inch) 99.8 per cent, carload lots, 27 cents; 100 pound lots or more, l.c.l., 29 cents. Extruded sticks, carload lots, 34 cents. Prices, July, 1943, were: per pound ingots (4 x 16 inch) 99.8 per cent, carload lots, 20½ cents; 100 pounds or more l.c.l., 22½ cents. Extruded sticks, carload lots, 27½ cents.

Magnesite is available in many countries. Russia is probably the world's greatest producer of magnesite, but almost all is for domestic use.

Magnesite is usually calcined before shipment and the resultant magnesia is used for the making of refractory products to withstand extremely high temperatures, for making oxychloride cement, and for magnesium metal. It is also the basis of a number of magnesium salts and has many minor uses. The world-wide demand for magnesium metal has greatly stimulated interest in deposits of magnesite. Although until three years ago almost all the world's magnesium was made from magnesium chloride brine and from waste water used in treating potash minerals, magnesite is now an important source of this light metal in Europe, England and the United States.

Table 117.—Consumption of Magnesium Ingots in Canada, 1940-1942

	1940	1941	1942
	pounds	pounds	pounds
In non-ferrous smelters.....	192,000	825,717	1,072,346
In white metal alloy foundries.....	7,770	9,515	9,850
In brass and bronze foundries.....	163	42,821	44,553
In aluminium products.....	240	127	.....
In ammunition.....	404	.....	.....
In pharmaceuticals.....	.....	.....	.....
Total Accounted For.....	200,577	878,180	1,126,749

MANGANESE

Mine production (shipments) of manganese ores in Canada during 1942 totalled 435 short tons valued at \$8,932. This output comprised 61 tons of very low grade material shipped by the Atlantic Manganese Company from a stockpile on the Dean and Chapter and Cain mines located at New Ross in Nova Scotia. The Dominion Department of Mines did about 6,000 feet of diamond drilling on these deposits in 1942. The balance of Canadian shipments of manganese ores during the year under review came from New Brunswick, where the Nabco Manganese Mining Company operated the mine and concentrator on Gowland Mountain, near Elgin. After shipping a number of car lots of concentrates, the mine and mill were closed down in August. One or two car lots of ore were shipped by the Turtle Creek Manganese Prospecting Syndicate from the Turtle Creek deposit 35 miles northeast of Sussex.

In 1942 the Sussex Manganese Mining Company deposit and equipment at Jordan Mountain, 7 miles north of Sussex, were taken over by the British Manganese Mining Company. A few tons of ore from the dumps were put through the new mill early in 1943. The British Manganese Mining Company also acquired and opened up the old Shepody Mountain deposit north of Hopewell Hill, about 40 miles east of the Jordan Mountain deposit.

Official returns were received in 1942 from 5 firms reporting manganese mining operations; 1 in Nova Scotia, 3 in New Brunswick, and 1 in British Columbia. Capital totalled \$5,900; employees numbered 5, and salaries and wages paid amounted to \$5,316; \$1,125 were expended in fuel and process supplies.

A report prepared by the Bureau of Mines, Ottawa, contains the following information:

"The manganese ores that have been mined in Canada are pyrolusite (MnO_2), psilomelane (H_4MnO_6), manganite ($\text{Mn}_2\text{O}_3 \cdot \text{H}_2\text{O}$) and braunite (Mn_2O_3), all of which are black or grey-black and comparatively hard; bog manganese, a soft earthy black oxide; and a small amount of rhodochrosite (MnCO_3), a pink, fairly soft, mineral. Pyrolusite is the most common and most important and when pure contains 63 per cent manganese. It is much softer than the other hard rock ores and can be distinguished in the field by the ease with which it blackens the fingers. Most of the hard rock deposits are replacements in limestone, but they also occur in the form of accumulated nodules and cementing material in siliceous sediments, and as veins in metamorphosed precarboniferous rocks. Canadian production is small and is far short of wartime requirements.

"Nearly 70 per cent of the imports of manganese ore in 1942 were from the Gold Coast, Africa, about 20 per cent from British India, and most of the remainder from the United States.

"Estimates of world production are in the neighbourhood of 6,000,000 tons annually, those countries that probably produced 200,000 tons or over in 1941 in order of their output being Russia, British India, Gold Coast, Brazil, Union of South Africa, Egypt (Sinai), and Cuba.

"It is estimated that over 90 per cent of the world consumption of manganese ore is used in the manufacture of iron and steel, the ore so used being termed 'Metallurgical'. The remainder is termed 'Chemical'. Metallurgical ore is used for making ferro manganese, silico-manganese, and spiegeleisen, in which forms it is added to the steel bath. Manganese is beneficial mainly in improving the workability of the steel, and in improving the product by acting as a deoxidizer, a desulphurizer, and a re-carbonizer. Until fairly recently, about 14 pounds of manganese were used on the American Continent in each ton of steel, but in order to conserve manganese, the average has been reduced to about 11.8 pounds per short ton of steel. Ferro manganese, containing 75 to 82 per cent manganese, is by far the most important addition agent, and to make it, the highest, or 'ferro grade' ore is used.

"Ferro grade ore should contain at least 48 per cent of manganese and not more than 7 per cent iron, 8 per cent silica, 0.15 per cent phosphorus, 6 per cent alumina, and one per cent zinc. It must be low in copper, lead, and barium, and the ratio of manganese to iron should not be less than seven to one. The ore should be hard and in lumps of less than four inches, and not more than 12 per cent should pass a 20-mesh screen. Soft ores, such as bog manganese, are objectionable unless they are briquetted. United States Metals Reserve Company buys ores down to a minimum of 35 per cent manganese and maxima of certain impurities, details of which are given below under 'prices'.

"Chemical grade ores are used mainly in the manufacture of dry batteries. Specifications call for high-grade pyrolusite because of its high available oxygen, which acts as a depolarizer. The ore should contain not less than 75 per cent manganese dioxide (MnO_2) and not more than 1.5 per cent iron; 1.0 per cent alumina; 6.0 per cent silica; 0.02 per cent copper; less than 0.05 per cent of any other metal; and 1.0 per cent moisture. It should also be finely ground (80 per cent through 150-mesh). Canadian requirements of chemical ore range from 3,000 tons to 4,000 tons a year and nearly all of it is used by two manufacturers of dry batteries in Toronto and another in Niagara Falls, Ontario. Chemical ore is used also in the glass and ceramic industries; as paint and varnish driers; as pigments and dyeing materials; and as salts for disinfecting; bleaching, and fertilizers.

"Each ore or individual deposit presents a separate treatment problem, thus differing from the ores of copper, zinc, lead, and of other non-ferrous metals.

"Prices of ferro grade ore depend on manganese content and the amount of harmful impurities. Imported ore is usually quoted in cents per long ton unit of 22·4 pounds of contained manganese. United States prices for metallurgical ores are based on a standard duty free ore (Cuban and domestic) containing 48 per cent manganese, 6 per cent iron, 11 per cent silica and alumina combined, and 0·18 per cent phosphorus. The quotation for this grade is 85 cents per long unit of contained manganese at Gulf of Mexico ports, and 90 cents at New York and other Atlantic ports.

"The price premiums and penalties for ores varying from the standard grade are as follows: Premium per long unit is $\frac{1}{2}$ cent for each per cent Mn above 48 per cent and $\frac{1}{2}$ cent for each per cent iron below 6 per cent. Penalties per long unit are one cent for each per cent Mn below 48 per cent down to 44 per cent and on an increased scale down to 20 cents for the minimum 35 per cent Mn. Penalties are also deducted for the excess of impurities above the standard up to the maxima of 8 per cent Fe ($3\frac{1}{2}$ cents); 15 per cent $\text{SiO}_2 \div \text{Al}_2\text{O}_3$ (7 cents) and 1 cent for each 0·03 per cent P above 0·18 per cent P.

"Prices of chemical grade (battery grade) manganese ores early in 1943 were \$55 per ton for Brazilian or Cuban ores (80 per cent minimum content of MnO_2) in car lots, f.o.b. New York, exclusive of duty. The delivered price in Canadian currency for finely ground battery grade ore in bags imported into Canada from Africa or Montana, U.S.A., was about \$60 to \$80 a ton depending on mesh and origin."

Table 118.—Production (Sales) of Manganese Ore in Canada for Years Specified

Year	Tons	Value	Year	Tons	Value
		\$			\$
1915.....	201	9,360	1935.....	100	800
1916.....	957	89,544	1936.....	221	1,596
1917.....	158	14,836	1937.....	85	817
1918.....	440	6,230	1938.....		
1924.....	584	4,088	1939.....	396	3,688
1925-1929.....			1940.....	152	4,315
1930.....	273	1,356	1941.....		
1931.....	117	2,893	1942.....	435	8,932
1932-1934.....					

* 7,500 pounds manganese metal produced at the mine from Nova Scotia manganese ore.

Table 119.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1941 and 1942

Industry	Items	Quantity	Value
			\$
1941			
Electrical apparatus and supplies.....	Manganese dioxide.....pound	6,245,993	208,806
Paints, pigments and varnishes.....	Manganese salts.....pound	68,623	9,416
Steel ingots and castings.....	Ore, manganiferous (foreign).....pound	128,000	3,316
	Spiegeleisen.....long ton	5,316	365,656
	Ferromanganese.....long ton	21,250	1,811,031
	Silicomanganese.....long ton	4,518	445,197
1942			
Electrical apparatus and supplies.....	Manganese dioxide.....pound	5,377,595	202,273
Paints, pigments and varnishes.....	Manganese salts.....pound	68,676	8,743
Steel ingots and castings.....	Ore, manganiferous (foreign).....pound	64,000	1,600
	Spiegeleisen.....long ton	2,599	153,054
	Ferromanganese.....long ton	1,714	2,484,783
	Silicomanganese.....long ton	7,201	918,774

NOTE.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys. Also, in 1941, approximately 38 tons of manganese metal was consumed chiefly in the non-ferrous industries.

MERCURY

"Cinnabar (HgS), the principal ore of mercury, is a heavy mineral (s.g. = 8.1) with a deep cochineal-red colour and scarlet streak, and contains 86 per cent mercury. In Canada the ore occurs in porous rocks, such as altered limestones (ankerite), volcanic breccias or greenstones, and green and purple andesitic lavas. The cinnabar often occurs in veins and stringers of calcite or dolomite within these rocks and may be associated with stibnite (antimony sulphide) and accompanied by globules of metallic mercury.

"The only known deposits of cinnabar in Canada are in British Columbia, by far the most important development being that on the northwest side of Pinchi Lake, Omineca Mining Division, about 40 miles north of Vanderhoof station on the Canadian National Railway. The deposit was discovered in the summer of 1937 by J. G. Gray of the Geological Survey, Ottawa, and claims were staked in May, 1938, by A. J. Ostram and others. Late in that year they were optioned to Consolidated Mining and Smelting Company. Prospecting disclosed large cinnabar-bearing areas in veins and impregnations mainly in dolomitized and brecciated limestone along zones of fracturing and shearing. A plant was erected and production was started in June, 1940. The present plant, consisting of Wedge roasters, kilns, and condensers, has been enlarged periodically and is over twenty times the capacity of the original. The grade of ore treated is about 0.3 per cent mercury. The deposit is on a steep mountain side and has been developed by adits at a number of different levels. Prior to the discovery of the Pinchi Lake deposits little mercury was produced in Canada and their successful operation has brought about a complete change in the Canadian situation in respect to the metal. This mine is probably one of the largest single producers of mercury on the American continent and its output is far in excess of the domestic requirements. Ore reserves are estimated to be sufficient to assure continuous output at the present rate for several years.

"A number of cinnabar claims have been staked on both sides of Yalakom River above the mouth of Shulaps Creek, 30 miles northwest of Lillooet. The Red Eagle group, staked in 1937 by C. J. Parker, has changed hands several times and is now being worked by John Thompson of Moha. Ore was treated in a small crushing unit and a retort and about five flasks of mercury were produced in 1942. Copper Creek Mercury Mines (F. L. Gorse) operated the old Copper Creek deposits on the north shore of the west end of Kamloops Lake that was worked in 1894. A small tonnage of ore was treated in a retort and a few flasks of mercury were produced. Late in the year the Gould plant of Empire Mercury Mines north of Minto City in the Bridge River area was dismantled and shipped to Copper Creek and production on an increased scale is expected by midsummer of 1943. A few miles northwest of Copper Creek, G. F. Dickson and T. R. Hardie did some work on the Hardie Mountain deposits. A few tons of ore were roasted in a small retort and a few flasks of mercury were produced.

"A number of mercury discoveries have been made in the area 50 to 100 miles northwest of the Pinchi Lake mine and where extensive prospecting work is being maintained by Consolidated Mining & Smelting Company; Hollinger Exploration Company; Bralorne Mines Ltd., and others. The more important are those at the head of Silver Creek, 18 miles east of Takla Landing, where diamond drilling and stripping has given encouraging results and shaft sinking preparatory to underground development is underway. The installation of a treatment plant is expected in the near future. Bralorne Mines is developing a mercury property at Relay Creek, about 35 miles from the Bralorne Gold Mine in the Bridge River district and where the erection of a treatment plant is contemplated. Prospecting is active on several other cinnabar showings in the Bridge River and Yalakom River areas. New discoveries in the Poison Mountain area, west of Clinton and of Fraser River are also being prospected.

"World production just prior to the war was estimated to be slightly in excess of 5,000 metric tons a year. For many years Italy and Spain have shared honors as the leading producer and prior to the war they accounted jointly for 70 per cent of world output, while the United States contributed about 15 per cent. Mexico, Russia, Czechoslovakia, China, and Japan are also producers of mercury.

"In Canada about 75 per cent of the mercury consumed is used in the medicinal, pharmaceutical, and in heavy chemical industries, particularly in the form of mercury sulphate as a catalyst. The consumption of mercury in Canadian gold mines has decreased owing to wider use of cyanidation and improvements in the recovery of the mercury after amalgamation. Gold mining now uses about 7 per cent of the total mercury consumed.

"The New York prices for the iron flask of 76 pounds of mercury averaged \$75.00 in 1938; prices at the end of January, 1943 were \$196 to \$198 in 100-flask lots. Imports of mercury into Canada from the United States are not subject to duty, but have a sales and war tax amounting to 18 per cent of the value in Canadian funds. The present price of Canadian mercury is largely governed by that of the United States. Canadian imports into the United States are subject to a tariff of 25 cents per pound, or \$19 a flask, in the United States currency.

"Specifications call for a minimum of 99.5 per cent mercury and a maxima of 0.3 per cent antimony and 0.1 per cent arsenic.

"Because of the present substantial surplus production in Canada the larger Canadian buyers are not purchasing in less than 50 to 100-flask lots. Considerable difficulty is, therefore, experienced in disposing of small lots of a few flasks.

"Owing to the greatly increased production of mercury from Canada, United States, and Mexico, the position of the Allied countries, which prior to the war were largely dependent on Spain and Italy for their supplies is now so much stronger that there is no longer an urgent need for an intensive search for new deposits. Only large deposits of economic grade ore are of interest at present. If such a deposit can be mined cheaply and on a large scale, ore grading as low as 0.25 per cent mercury or even slightly less could possibly be mined at a profit."—(Bureau of Mines, Ottawa.).

Production of mercury in Canada during 1942 totalled 1,035,914 pounds valued at \$2,943,807.

Table 120.—Consumption of Mercury in Specified Canadian Industries, 1941 and 1942

	1941	1942
	pounds	pounds
Medicinals and pharmaceuticals.....	67,607	78,362
Heavy chemicals (catalyst).....	35,319	50,968
Electrical apparatus.....	25,738	42,313
Non-ferrous smelters.....	4,635	1,201
Petroleum refineries.....	920	684
Gold mines.....	11,091	10,000
Ammunition.....	8,217	.....
Other industries.....	2,591	1,650
Total Accounted For.....	156,118	185,178

Table 121.—Mercury Mining in Canada, 1942 (all in British Columbia)

	No.	(*)
Active firms.....	No.	4
Capital employed.....	\$	.....
Employees—On salary.....	No.	28
Wage-earners.....	No.	252
Total.....	No.	280
Salaries and wages—Salaries.....	\$	67,271
Wages.....	\$	713,749
Total.....	\$	781,020
Gross value of production.....	\$	2,943,807
Cost of fuel and electricity.....	\$	229,118
Process supplies used.....	\$	72,068
Net Value.....	\$	2,642,631

(*) Partly included with silver-lead mining industry.

MOLYBDENITE

"Molybdenite, the chief ore of molybdenum is a soft and shiny steel blue-grey sulphide containing 60 per cent of the metal. In Eastern Canada it is usually found in pegmatite dykes or along the contacts of limestone and gneiss, commonly associated with greenish-grey pyroxenites in which other metallic minerals, such as pyrite and pyrrhotite often occur. In northern and western Ontario and in British Columbia, molybdenite is usually associated in quartz veins, intruding granites, or diorites. It generally occurs in the form of soft, pliable flakes or leaves, but is sometimes semi-amorphous, filling cracks and smearing the rock surface. It can readily be distinguished in the field by rubbing on glazed white porcelain or enamel when it leaves an olive grey-green smear. Graphite, which closely resembles and for which it is often mistaken, leaves a grey-black smear.

"Quyon Molybdenite Company, Quyon, Quebec, about 35 miles northwest of Ottawa, was by far the largest producer in 1942. The ore is treated in a 100-ton mill and the concentrate is roasted to produce molybdenum trioxide, which is sold to steel manufacturers. The company treated about 5 car lots of ore from Alice Arm, British Columbia, that had been lying in the old mill dump at Renfrew since 1917. About a car lot from Mount St. Patrick, Ontario and from Gayhurst township, Quebec, were also treated in the company's mill. The Government-sponsored Wartime Metals Corporation controls two molybdenite properties, one being the Molybdenite Corporation deposit in LaCorne township, 15 miles northwest of Val d'Or, Quebec, which is being operated by Siscoe Gold Mines Ltd. The pilot mill was remodelled and a few tons of concentrate were shipped to Quyon for roasting. A substantial tonnage of ore has been blocked out and plans are underway to erect a mill suitable for full-scale operations. The other Wartime Metals project is the Zenith Molybdenite property southwest of Renfrew, Ontario. A few hundred tons of ore obtained from underground development were hoisted and stockpiled; but operations ceased early in 1943. Farley Mining Company is operating a deposit that was prospected about 50 years, near Montcerf, north of Maniwaki, Quebec. A few car lots of ore and picked flake have been shipped from the property to Zenith and LaCorne for treatment. A car lot of ore was shipped to the United States by Edgemont Molybdenite Mines Ltd. from the property at Shutt in Raglan township, south of Barry's Bay, Ontario. A car lot was shipped to the Quyon mill by T. Doyn from Bayhurst township, about 12 miles north of Megantic in the Eastern Townships of Quebec.

"Owing to the greatly increased demand for molybdenum, there was considerable development and prospecting activity on some of the 400 occurrences and deposits known throughout the Dominion.

"The outstanding development in 1942 resulted from the discovery by Dome Exploration Company of a large body of good grade disseminated molybdenite on the south of the old St. Maurice Mines property on the Indian Peninsula, Kewagama Lake, Preissac township, in the Abitibi district, Quebec. It is being operated by Indian Molybdenum Limited. Tunnelling and shaft sinking is in progress and a 500-ton treatment mill is being erected. Production is expected to start before mid-summer of 1943. Neighbouring claims are being prospected by various companies.

"World production in 1939 (1940 to 1942 not available), was 16,500 tons of metallic molybdenum, of which 91 per cent came from the United States. In 1942, the United States produced concentrate estimated to contain about 21,000 tons of the metal, against 17,580 short tons in 1941. Climax Molybdenum Company, at Climax, Colorado, the world's largest producer, is treating daily 18,000 tons or more of approximately 0.5 per cent MoS_2 ore and contributed about 67 per cent of the United States output in 1941. Most of the remainder was obtained as a by-product in the treatment of copper ores from New Mexico, Arizona, and Utah. Vanadium Corporation's Urad mine in Colorado was recently purchased by the Defence Plant Corporation and will be operated by Molybdenum Corporation of America; production is expected by the middle of 1943.

"Production from Cananea, Mexico, is estimated at the equivalent of 750 tons of the metal a year; and molybdenite concentrate is being recovered as a by-product from the Braden Copper Mine at Sewell, Chile. Prior to the war, the Knaben mine in Norway was the largest producer outside the American continent, its output in 1940 being about 500 short tons. It is reported that Germany has been obtaining 2,000 tons of MoS_2 annually from Norwegian mines, but that the Knaben mine was bombed recently and the plant is reported to have been seriously damaged. Other producing countries were Mexico, Peru, French Morocco, Korea, Greece, Turkey, Yugoslavia and Australia.

"In spite of the large output of molybdenum in the United States the demand is still very urgent. It should be pointed out, however, that although hundreds of occurrences are known in Canada—and many more are likely to be found—the great majority are so small and irregular that costs of production from them would be considerably higher than the present increased Canadian price of the mineral. It is expected that before the end of 1943 production from the Dome and LaCorne properties in the Abitibi region of Quebec will take care of at least half the domestic consumption of the metal.

"The price at New York of 90 per cent molybdenite concentrate is nominally 45 cents (49.5 cents in Canadian funds) a pound of contained molybdenum sulphide, but the duty on ore or concentrate into the United States is 35 cents a pound of the metallic molybdenum contained therein (about 20 cents a pound for a 90 per cent concentrate). The price of Canadian concentrate is approximately 85 cents per pound of contained molybdenum sulphide in a concentrate of not less than 85 per cent MoS_2 , delivered at mill."—(Bureau of Mines, Ottawa).

Table 122.—Production of Molybdenite in Canada, 1925-1942

Year	Ores treated	Ores and concentrates shipped or used		MoS_2 content of shipments
	Tons	Tons	Value (a)	Pounds
			\$	
1925.....	2,779	15.3	11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	280	1,222
1932-1936.....				
1937.....	5,307	8.25	8,147	(b)
1938.....	(b)	6.5	4,500	(b)
1939.....	1,492	1.3	816	(b)
1940.....	3,936	11	10,280	(b)
1941.....	28,100	(c) 98.3	88,470	173,991
1942.....	28,793	(c) 114	134,963	158,783

(a) Values as recorded by operators 1925-1940; values estimated for 1941 and 1942.

(b) Not known.

(c) Used entirely for making oxide at Quyon, Quebec.

Table 123.—Molybdenite Mining in Canada, 1942

	Quebec	Ontario	British Columbia	Canada
Active firms.....No.	11	3	2	16
Capital.....\$	194,871	42,173	(*)	237,044
Employees—On salary.....No.	39	3	1	43
Wage-earners.....No.	118	5	4	127
Total.....No.	157	8	5	170
Salaries and wages—Salaries.....\$	27,576	1,510	396	29,482
Wages.....\$	177,495	5,238	7,516	190,249
Total.....\$	205,071	6,748	7,912	219,731
Gross value of production.....\$	131,906	150	†2,907	134,963
Fuel and electricity used.....\$	29,953	1,012	(*)	30,965
Process supplies used.....\$	17,566	226	3,332	21,124
Freight and treatment charges.....\$	34,243	(*)	(*)	34,243
Net value of production.....\$	50,144	-1,088	-425	48,631

† Shipped to Quyon, Quebec from old stock stored in Renfrew county, Ontario, since World War No. 1.

(*) Data not available.

PITCHBLEND

Production of pitchblende products in 1941 was valued at \$925,196; the corresponding information for 1942 is not available for publication. Pitchblende ore from which these materials were recovered was obtained entirely from the mine of Eldorado Gold Mines Limited, located at Echo Bay, Great Bear Lake, Northwest Territories. Treatment of this ore is carried out at the company's refinery located at Port Hope, Ont. The mine was active in 1942 from April with actual mining operations being conducted from August 5; all concentrates produced at the property were consigned to the Port Hope refinery, which was in continuous operation throughout the year. Female labour was introduced at the refinery in the month of June.

"Most of the world production of radium and uranium ores has come from the Belgian Congo, Canada, and the United States. The American material consists mainly of low-uranium carnotite, found mainly in Colorado and Utah, and now mined chiefly for its vanadium content, the present recovery of uranium and radium being small. Ores of the Belgian Congo are mainly a complex assemblage of secondary uranium minerals resulting from the weathering of original pitchblende. The remainder of the world production has come mostly from Czechoslovakia, Portugal, England, Australia, and Russia, but the deposits in most of these countries are small and low-grade and are of minor importance at present.

"Although its fields of uses are increasing, radium continues to be used chiefly in the treatment of cancer. It is recovered in the form of the bromide salt of 90 per cent purity and is usually converted into sulphate for hospital use. When so used, the salt is loaded into fine gold or platinum-iridium needles containing usually one to ten milligrams of radium element. Larger dosages are given by means of so-called radium 'bombs', containing up to five and ten grams of the element. Radium is also employed at certain clinical centres for the production of radon, or radium emanation, a heavy gas of short-lived radioactivity, which is used in a form of cancer treatment. Because of its high cost, much of the radium used in hospitals for research, etc., is hired or loaned either from the producers or from loan firms. The current rate for leased radium in the United States is stated to be about 40 cents a milligram a month. Radium is used in place of X-rays in engineering radiography to detect flaws in heavy castings and welds, and its employment in this field has been increasing rapidly in the heavy industries. It is used in self-luminous paints for clock, watch, and compass dials, aircraft instruments, boards, and panels, and for gun-sights, etc.

"Uranium, the heaviest known element, is used chiefly in the form of various salts, mainly the oxide and sodium uranate, which are employed as colouring agents in the ceramic industry.

"Prices for radium are not openly quoted, sales being mostly in lots of one gram or less, and are by individual tender. Before Canada became an important producer the price was about \$60.00 a milligram. Nominal quotations in the United States in 1940-42 ranged between \$20 and \$30 a milligram."—(Bureau of Mines, Ottawa.).

Table 124.—Value of Canadian Refinery Production of Pitchblende Products

Year	\$	Year	\$
1933 (*)	247,900	1938	1,045,458
1934	159,400	1939	1,121,553
1935	413,700	1940	410,176
1936	605,500	1941	925,196
1937	876,540	1942	(a)

(*) First production.

(a) Not available for publication.

SELENIUM

Selenium, although fairly widely distributed, is not abundant in nature. It occurs in association with sulphur, and frequently accompanies the sulphides of heavy metals in the form of selenides. In no case does it occur in quantities large enough to be mined for itself alone.

Selenium production in Canada represents a by-product in the electrolytic refining of blister and anode copper made from Saskatchewan, Manitoba, Ontario and Quebec ores. It is recovered at Copper Cliff, Ont. by the International Nickel Company of Canada, Ltd., and at Montreal East, Que. by the Canadian Copper Refiners, Ltd. Canadian production in 1942 totalled 495,369 pounds valued at \$951,108 compared with 406,930 pounds worth \$777,236 in 1941.

World production of selenium is believed to approximate 300 to 500 short tons a year, the United States and Canada being the principal sources of supply.

Selenium is at present used chiefly in the glass and pottery industries, both as a colouring agent—as in ruby glass—and to neutralize the effect of objectionable oxides. To a minor extent, it is used in the photo-electric cell, or electric eye, which is finding many industrial applications, and in alloying stainless steel for screw and bolt stock, where it develops improved cutting and threading qualities. It is employed to improve the machinability of copper and copper alloys. It has a large potential market in certain rubber compounding industries and is now being used for the vulcanizing and fireproofing of switchboard cables and to increase the resistance of rubber to abrasion, these applications being still subjects of research. Selenium is used in the manufacture of certain kinds of paint and of certain dyes. As selenium oxychloride, it is a powerful solvent of many substances. The use of the metal in the production of improved cutting-tool steels and in the vulcanizing of rubber appears to offer the best opportunities for the expansion of the market. Rapid progress is also being made in the production of high-quality, selenium rectifiers, which require large quantities of selenium.

Selenium is marketed as a black to steel-grey amorphous powder, but cakes and sticks are also obtainable. Among the other products marketed are ferro-selenium, sodium selenite, selenious acid, and selenium dioxide. The nominal price per pound for black powdered selenium, New York, was \$1.75 in both 1941 and 1942.

Consumption of selenium in the manufacture of glass in Canada during 1942 was estimated at 3,647 pounds compared with 4,211 pounds in 1941 and 4,532 pounds in 1940.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry.

TANTALUM-COLUMBIUM

Neither tantalum nor columbium ores are commercially produced in Canada; however, it is interesting to note that the Department of Mines and Resources, Ottawa, reports that columbite-tantalite has been found in small quantities in a number of feldspar mines in the Dominion.

Ferrocolumbium is used in the manufacture of stainless steels and it has been reported that the pure metal may be utilized in the construction of certain vacuum tubes.

Tantalum is strongly resistant to acid corrosion, is weldable and easily fabricated. It is used in chemical process equipment and electronic tubes. Due to its hardness and high melting point, tantalum carbide is a constituent of hard cutting-tool mixtures. Ferrocolumbium has become an important alloy for the manufacture of weldable high-speed steels.

Tantalum ore prices, New York, March, 1943, were: per pound Ta_2O_5 , \$2 to \$2.50 for 60 per cent concentrate, the price depending on source of supply.

Tantalum metal was quoted in the United States throughout 1942 at \$160.60 (base) a kilogram for C. P. rod and \$143 for sheet, subject to discounts on volume business. Corresponding figures for columbium metal were \$560 a kilogram for rod and \$500 for sheet. Ferrocolumbium, 50 to 55 per cent, was quoted at \$2.25 to \$2.35 a pound of columbium contained (f.o.b. producer's plant). These same prices prevailed in March, 1943.

TELLURIUM

As with selenium, the metal is recovered in Canada as a by-product in the electrolytic refining of anode copper at Montreal East, Que. by Canadian Copper Refiners, Limited, and at Copper Cliff, Ont. by the International Nickel Company of Canada, Limited. The production in Ontario represents the recovery of the metal solely from nickel-copper ores; whereas at Montreal East the metal originated in copper-gold ores mined in Manitoba, Saskatchewan and Quebec. Commercial production in Canada from all ores totalled 11,084 pounds valued at \$17,735 in 1942 compared with 11,453 pounds worth \$18,394 in 1941.

"Metallic tellurium, until quite recently, was of little industrial importance. Formerly it was used to a small extent in some radio work and was used also in the photographic arts and for blackening art silverware. Small quantities are used as a colouring agent in the ceramic industry. More recently industrial research has shown that when alloyed with lead, the tensile strength and toughness of the lead is increased greatly. The use of small quantities of tellurium as a substitute for tin in the lead used for sheathing electric wire cables is reported to improve the resistance of the cables to heat and corrosion. It has also been used for improving the machining qualities of certain steels. Very finely powdered tellurium may be used as rubber-compounding material. Its presence is stated to shorten the time of curing, and to greatly improve the resisting qualities of the product. Tellurium is also used in the steel industry, but so far mainly in an experimental way. A newly patented 'daylight lamp' employed tellurium vapour in a tube to fill in certain wave lengths to produce a continuous spectrum".—(Bureau of Mines, Ottawa.)

A nominal price for tellurium of \$1.75 per pound at New York prevailed throughout 1942.

In 1942 Canadian steel foundries consumed 50 pounds of tellurium compared with 185 pounds in 1941. White metal foundries used 612 pounds in 1942 against 492 pounds in 1941.

TIN

Metallic tin was commercially produced in Canada from domestic ores for the first time in 1941. Production totalled 64,744 pounds valued at \$33,667. The metal was recovered in British Columbia from British Columbia ores mined and treated by the Consolidated Mining and Smelting Company of Canada, Limited. Canadian production in 1942, all from the same source, totalled 1,237,863 pounds worth \$643,689.

"The tin produced at Kimberley and the small domestic recovery of secondary tin are far from sufficient to meet the Canadian requirements, which in peacetime amounted to about 2,700 tons a year and are now much larger. They were obtained mostly from smelters in the Straits Settlements. The position of the Allied countries in respect to tin has become critical since the capture by Japan of these smelters and of the Malayan tin mines, with the result that the civilian use of the metal is being increasingly curtailed. The search for commercial deposits in Canada has acquired added importance.

"Because of changing conditions and the wide range in the market value of the metal, no definite statement can be made as to what constitutes payable ore. Under wartime conditions, however, provided the deposit is reasonably large, it is worthy of attention, even though the grade of the material is lower than would ordinarily be regarded as suitable for commercial development. Most tin ores are too low in grade to be treated directly and accordingly must be concentrated. Concentrates are in most cases purchased on a 60 per cent tin basis and for each unit or fraction above or below 60 per cent the returning charge is reduced or increased. They are subject to penalties if they contain more than one per cent sulphur and 5 per cent iron. Antimony, arsenic, bismuth, copper, lead, and other impurities are not penalized. Consolidated Mining and Smelting Company is prepared to treat tin concentrate at its new smelter at Kimberley to the limit of its relatively small capacity.

"The prices of tin in New York were fixed in August, 1941 at 52 cents a pound and remained at that level to the end of the year and throughout 1942."—(Bureau of Mines, Ottawa.)

Table 125.—Consumption of Tin in Canada, by Industries, 1939-1942

	1939	1940	1941	1942
	(short tons)			
Brass and bronze foundries.....	129	338	437	217
White metal foundries.....	1,640	2,021	3,141	1,530
Steel foundries (chiefly for tin plate).....	810	1,270	2,346	1,428
Iron foundries.....	52	84	224	49
Galvanizing plants.....	.....	90	50	226
Jewellery and silverware plants.....	45	49	146	15
Electrical apparatus plants.....	34	43	56	24
Miscellaneous industries.....	77	82	36	30
Total accounted for.....	2,787	3,977	6,436	3,519

Production of secondary tin in Canadian plants in 1942 was estimated at 64,511 pounds compared with 201,969 pounds in 1940 and 384,000 pounds in 1941.

TITANIUM

Production of titanium ores in Canada during 1942 totalled 10,031 short tons valued at \$50,906 compared with 12,651 short tons worth \$49,110 in 1941. Commercial production of these ores in Canada has been confined for several years to the St. Urbain deposits, Charlevoix county, province of Quebec. In 1942 shipments from this area were made by the Baie St. Paul Titanic Iron Ore Company and J. A. Coulombe and Company Limited. In addition, a few tons of ore from Bourget township, Chicoutimi county, were employed for experimental purposes by Titanium Products Corporation.

"All known occurrences of titanium in Canada of any possible economic interest are in the provinces of Quebec and Ontario.

"Ilmenite or titanite iron (FeTiO_3) in commercial quantities and carrying from 18 to 25 per cent of titanium is found at St. Urbain in Charlevoix county, and at Ivry in Terrebonne county, Quebec. Rutile (TiO_2), which usually contains 54 to 59 per cent titanium, is found mixed with the ilmenite in parts of one of the St. Urbain occurrences and in sufficient quantities to make it of possible importance for the rutile alone, this being the only known workable deposit of rutile in Canada. Titaniferous magnetite deposits (magnetite carrying 3 to 15 per cent titanium) occur on the Saguenay River, near Lake St. John, and at Bay of Seven Islands, both in Quebec, and on the shores of Seine Bay and Bad Vermillion Lake in western Ontario.

"Commercial uses for titanium in recent years have continued to increase independently of the trend of general business. Ilmenite continues to be used chiefly in the manufacture of white pigment, and it is used to a smaller extent for making ferro-alloys.

"The world production of titanium ore is estimated at about 260,000 tons of ilmenite, which would yield 115,000 tons of titanium pigment, and 3,000 tons of rutile. India is the principal producer of ilmenite, the other producers being Norway, Malaya, Portugal, Australia, United States and Canada. Brazil is the principal producer of rutile, and Norway is second in importance."—(Bureau of Mines, Ottawa.)

Table 126.—Consumption of Titanium Pigments in Canadian Paint Industry, 1931-1942

Year	Pounds	Cost at works	Year	Pounds	Cost at works
		\$			\$
1931.....	745,207	89,761	1937.....	3,748,341	362,869
1932.....	691,304	96,759	1938.....	3,903,337	378,548
1933.....	1,061,249	128,969	1939.....	5,088,234	494,914
1934.....	1,710,188	186,678	1940.....	6,138,760	616,360
1935.....	2,513,026	261,506	1941.....	8,971,865	1,004,591
1936.....	2,456,265	269,130	1942.....	7,034,376	578,894

Table 127.—Consumption of Titanium White in Canadian Paint Industry, 1936-1942

Year	Pounds (*)	\$ (*)
1936.....	1,396,337	193,638
1937.....	1,299,857	193,107
1938.....	1,341,359	200,552
1939.....	1,855,288	275,103
1940.....	2,297,248	344,945
1941.....	3,076,490	560,621
1942.....	4,168,097	820,990

(*) Included with annual data as shown in Table 126.

NOTE.—Neither titanium white nor titanium alloys are commercially produced in Canada.

In 1939 there were 118 tons of ferrotitanium valued at \$23,498 consumed in the manufacture of steel in Canada; in 1940, 118 tons worth \$24,233, in 1941, 181 tons valued at \$52,128, and in 1942, 439 tons worth \$66,555.

TUNGSTEN

The following information was obtained from a report "Tungsten in 1942" as prepared by the Bureau of Mines, Ottawa:

"Wolframite, $(\text{Fe}_2\text{Mn})\text{WO}_4$, is the principal ore of tungsten, the next in importance being scheelite (CaWO_4), a calcium tungstate. The former is a dark brown to black heavy mineral which contains 76.4 per cent WO_3 (tungstic oxide) when pure, and is not common in Canada. Scheelite, the chief Canadian ore of tungsten, is a heavy, usually buff, but sometimes white mineral with a dull lustre, which contains 80.6 per cent WO_3 when pure. It is commonly associated with quartz and frequently occurs in gold-bearing veins. It can be detected readily (in the dark) by its brilliant pale bluish-white fluorescence under ultra-violet light and purple filter. The lamps for this purpose are at present made only in California, but all duties into Canada on them have been removed. Full details regarding these lamps may be obtained from the Federal or Provincial Departments of Mines.

"Production of concentrate in 1942, although over five times greater than in 1941, was still far short of domestic requirements. The two chief producers during 1942 were Consolidated Mining and Smelting Company's Red Rose property in central British Columbia, and Hollinger Consolidated Gold Mining Company at Timmins, Ontario. International Tungsten Mines Limited made shipments from its property on Outpost Island, Great Slave Lake, Northwest Territories; and small amounts of ore or crude concentrate were shipped to Ottawa for treatment from properties in every province, except Alberta and Prince Edward Island. The shipments were chiefly low-grade concentrate from the Indian Path property of Tungsten Mines Limited, in Nova Scotia.

"In Nova Scotia, Tungsten Mines Limited (Ventures Limited) erected a 70-ton stamp flotation mill at the Indian Path mine, near Lunenburg and continued underground development to a depth of 230 feet. Several thousand tons of low-grade ore was treated and the crude concentrate was shipped to Ottawa for final treatment.

"In Quebec, small amounts of scheelite occur at a number of gold producing mines, particularly in the general region east of Rouyn to Val d'Or. With Dominion Government financial assistance, the Quebec Department of Mines erected a small scheelite treatment plant at the Mine School west of Val d'Or, and late in the year started treating custom ore from the Lamaque, Sigma, Perron, Central Cadillac, McWatters, and Wood Cadillac mines, which ore had previously been shipped to Ottawa. The principal shipper to Val d'Or early in 1943 was Kerr-Addison Gold Mines on the Ontario side of the boundary. Sullivan Consolidated Mines, 3 miles northwest of Val d'Or is making a high-grade table concentrate from ore picked from the belt. Prospecting was continued on the Manley property in La Reine township and by Toburn Gold Mines on the Kayrand claims in Dalquier township northwest of Amos, but the company relinquished its option. Upstream Gold Mines (Donhurd) prospected claims in the vicinity of Dasserat Lake, 18 miles west of Rouyn; and prospecting was continued in the Marlow-Risborough area about 30 miles northeast of Megantic in the Eastern Townships.

"In Ontario, scheelite is known to occur at at least 70 different properties throughout the province, but, with a few exceptions, the amounts are too small to be worthy of attention. The main producers are the large gold mines of the Porcupine area, principally the Hollinger mine, and properties in the Beardmore, Little Long Lac, Red Lake, and Larder Lake areas.

"In the Hollinger mine, scheelite zones or bodies have been found in quartz in or close to the porphyry in at least 100 separate places from the surface down to the 5,150-foot level. The scheelite mill started to produce in March, 1942, and is treating 135 tons of ore daily. The company reports shipments of 67.6 tons of high-grade concentrate during 1942. Some custom ore was treated in the Hollinger mill from nearby Porcupine mines, including Aunor, McIntyre, DeSantis and Dome, but Aunor is now the only steady shipper. Small regular shipments of ore were received at Ottawa from Preston East Dome. Delnite is tabling and jigging its flotation tailing and shipping the resulting low-grade concentrate (high in iron and arsenic) to Ottawa for cleaning tests.

"In the Thunder Bay district east of Lake Nipigon, Little Long Lac Gold Mines at Geraldton stockpiled scheelite ore obtained from a picking belt over which an ultra-violet lamp is set up. A 20-ton scheelite mill was installed and treatment started in January, 1943.

"In Manitoba and Saskatchewan, prospecting was carried out on a number of scheelite occurrences on both sides of the boundary, south of Flin Flon, mainly in the vicinity of Phantom Lake, the most promising being the Mosher-Lundmark claims on the east side of the lake. About 20 miles to the east, Gold Hill development is prospecting a deposit near Cranberry Portage. At Herb (Wekusko) Lake in north-central Manitoba, considerable prospecting was done by Tungold Mines (Jack Nutt), the principal showing being the old Apex claim on the east side of the lake from which a few tons of picked ore was shipped to Ottawa for tests in the fall of 1942. There was considerable prospecting activity on the Falcon-West Hawk Lake area in the southeast corner of Manitoba. Scheelite was discovered here in 1917, and about 4 tons of cobbed ore was shipped during the next year. Recent discoveries have extended the zone to a length of about 10 miles, along which the principal showings have been staked by Thor Gold and by J. A. Poirier. A ton or two of low-grade ore was shipped to Ottawa recently by N. S. Black from the north end of West Hawk Lake.

"British Columbia is the leading Canadian producer of scheelite, the chief source of its output being the Red Rose mine on the Skeena River, near Hazelton. The discovery of large bodies of scheelite at the Emerald property, south of Nelson, is one of the outstanding Canadian developments in connection with strategic minerals. Close to 100 occurrences of scheelite have been found so far in the province.

"Production of concentrate from its Red Rose property was started early in the year by Consolidated Mining and Smelting Company. The small mill was later enlarged to 75 tons a day and a 5,200-foot aerial tram line was installed to connect the mill with the top workings at 6,500-foot elevation. Scheelite and some ferberite occur in a quartz vein in a 400-foot thick diorite sill in contact with sediments. The company also operated the Tungsten Queen property in the Bridge River district and shipped ore to Kimberley for concentration. Late in the year, however, the property reverted to Ed. Phillips, who is again shipping high-grade massive white scheelite to Ottawa. Bralorne Mines is producing small quantities of scheelite concentrate from its gold property in the Bridge River area, a portion of which is being shipped to Ottawa for the removal of the sulphur. About a car lot of ore was shipped to Ottawa by J. W. Tillen from dumps of the Lucky Boy mine near Trout Lake, Lardeau area. About a ton of rough concentrate was shipped to Vancouver for re-concentration by Selkirks Tungsten-Tin Mines (Regal Silver) from its Woolsey property at Albert Canyon, northeast of Revelstoke. This property and the adjoining Snowflake were diamond drilled recently for tin and tungsten by the Department of Mines and Resources, Ottawa, but the results were inconclusive.

"Scheelite was discovered early in 1942 in the old Iron Mountain or Emerald mine, 6 miles southeast of Salmo and not far from the United States boundary. The ore is rather finely disseminated in several separate contact metamorphic zones between granite and argillite and to a lesser extent between granite and limestone and also in narrow bands of lime-bearing silicates (garnet, epidote, diopside) known as 'Skarn'. Large tonnages averaging 1.0 per cent WO_3 or better, have been estimated in the main Emerald zone. The property has been extensively diamond drilled and is being developed by Wartime Metals Corporation, a Dominion Government Company, and the 300-ton a day mill, connected to the mine workings by a $1\frac{1}{2}$ -mile aerial tram, is expected to be completed before midsummer of 1943. Several scheelite discoveries in the vicinity of the Emerald are being prospected.

"In the Yellowknife-Gilmour Lake region, north of Great Slave Lake, Northwest Territories, more than 1,000 scheelite bearing veins, mostly quartz, have been found by Dominion Government geologists and by private companies. Only a few of them, however, are sufficiently large to be of commercial importance.

"The property of the International Tungsten Mines on Outpost Island in Great Slave Lake has been developed down to the 425-foot level for the production of gold. The ore is a gold-copper-tungsten (scheelite and ferberite)-tin complex and difficulty is being encountered in producing a tungsten concentrate to meet specifications. During the past two years, a few car lots of low-grade concentrate produced in the company's mill, were shipped to the United States for tests and for commercial treatment. Several shipments were also made to Ottawa. An appreciable tonnage of tungsten ore is present, but production will depend largely upon the overcoming of metallurgical problems.

"In Yukon, placer operations were continued on the Taylor, Seaholm, Lund, and Swanson claims in Haggart Creek and at Dublin Gulch in the Mayo district. Shipments of the gold clean-ups containing high percentages of scheelite and wolframite were made to Ottawa. Dominion Government geologists have estimated a fair tonnage of tungsten minerals in these gravels and have also found occurrences of scheelite in place in the metamorphosed limestone beds of Ray Gulch, Cement Creek, and Lynx Creek in the Mayo district. These new finds will be investigated during the summer of 1943.

"World production of tungsten ore and concentrate in 1939 (figures since outbreak of the war are not available) on a basis of 60 per cent WO_3 , was about 34,000 tons, the principal producing countries being Burma, China, United States, Portugal, Bolivia, Korea, Japanese controlled areas in south China, and Argentina.

"Custom ores and crude concentrates are treated at the Ore Dressing plant of the Bureau of Mines, Booth Street, Ottawa; at the Quebec Department of Mines plant, Val d'Or, Quebec; and by War Metals Research Board, University of British Columbia, Vancouver.

"Tungsten ores are concentrated to a 60 per cent or higher of tungsten trioxide (WO_3). For adding to steel, the ore is generally converted into ferro-tungsten, but sometimes into tungsten oxide, calcium tungstate, or tungsten powder. Canada has as yet no plants for the manufacture of ferro-tungsten or other tungsten addition agents and the only plant making tungsten steels is Atlas Steels, Welland, Ontario. Only scheelite is used at present, and the high-grade concentrate of not less than 70 per cent WO_3 is added directly to the steel bath. This is possible because of the comparative ease with which the calcium forms a slag.

"United States specifications for scheelite are:— WO_3 —60 per cent minimum, the maximum percentages of the following harmful impurities being: copper and phosphorus each 0.05; arsenic, antimony and tin each 0.10; bismuth and sulphur 0.50 each; molybdenum, 0.40; and manganese, 1.00. For wolframite (or ferberite), 1.50 per cent tin is allowed, and a little more arsenic and bismuth. The ores may be in lump, fine, or a mixture of both.

"The price in Canada of scheelite concentrate containing 70 per cent WO_3 (within specifications) is \$26.50 a short unit of WO_3 , delivered at Welland, Ont., equivalent to about \$1,855 a short ton of 70 per cent concentrate, delivered. All sales of Canadian concentrate must be made through the Metals Controller, Ottawa, who also buys wolframite concentrate for export."

Table 128.—Tungsten Mining in Canada, 1942*

	British Columbia	Other provinces	Canada
Active firms.....	No. 7	(†) 8	15
Ore mined.....	Ton 8,471	9,968	18,439
Capital.....	\$ 712,434	87,872	800,306
Employees—			
On salary.....	No. 15	16	31
Wage-earners.....	No. 107	51	158
Total.....	No. 122	67	189
Salaries and wages—			
Salaries.....	\$ 18,673	17,396	36,069
Wages.....	\$ 183,935	69,724	253,659
Total.....	\$ 202,608	87,120	289,728
Fuel and electricity used.....	\$ 12,421	13,185	25,606
Process supplies used.....	\$ 18,527	23,341	41,868
Freight and smelter costs.....	\$ 3,473	874	4,347

(*) Not including data relating to the production of tungsten concentrates at auriferous quartz (gold) mines.

(†) Includes 2 in Nova Scotia; 3 in Quebec; 2 in Manitoba and 1 in Northwest Territories.

NOTE.—Owing to the difficulty of obtaining accurate production data direct from certain of these mines, the statistics of Canadian tungsten production for 1942 were compiled largely from customs mills returns and represent the combined tungsten recoveries from both "straight" tungsten ores and auriferous quartz ores. Canadian tungsten production in 1942 as thus defined totalled 520,981 pounds of concentrates valued at \$406,275.

Table 129.—Production of Crude Tungsten Concentrates in Canada

Year	Pounds	\$	Average per cent WO ₃
1912.....	28,000	(a)	72
1917.....	580	234	69.41
1918.....	(c) 27,000	11,700	73.8
1939.....	8,825	4,917	(a)
1940.....	12,002	7,303	70-75
1941.....	(b) 82,846	38,712	51.1
1942.....	(b) 520,981	406,275	62

(a) Not recorded.

(b) Includes export of considerable low-grade material to U.S.A.

(c) Included 11 tons produced at Burnt Hill, N.B., with smaller shipments from Yukon, Nova Scotia and Manitoba.

NOTE.—1942 production represents shipments of relatively high grade concentrates from Canadian customs mills plus exports of crude concentrate.

Table 130.—Tungsten Wire Used in the Manufacture of Canadian Electrical Apparatus and Supplies, 1931-1942

Year	Value	Year	Value
	\$		\$
1931.....	79,659	1937.....	52,768
1932.....	53,802	1938.....	50,594
1933.....	48,701	1939.....	52,207
1934.....	48,996	1940.....	62,175
1935.....	52,192	1941.....	62,696
1936.....	47,856	1942.....	129,265

Table 131.—Tungsten Consumed in Specified Industries, 1938-1942(a)

Year	Ferro-tungsten consumed in Canada in the manufacture of steel		Tungsten metal consumed in Canada in the manufacture of steel and alloys
	Long tons	Value \$	Pounds
1938.....	30	69,806	
1939.....	95	173,250	13,069
1940.....	336	829,859	15,474
1941.....	482	1,003,314	29,729
1942.....	577	1,440,141	36,882

(a) Other than tungsten-chromium.

VANADIUM

Some of the magnetites of the Rainy River and other districts in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado, and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid and in the non-ferrous, glass, ceramic and colour industries.

In 1943 vanadium-bearing soot and ash from certain South American fuel oils was being collected by the Canadian Wartime Metals Corporation from Canadian vessels at Canadian ports, in comparatively small quantities, and shipped to an American smelter for treatment.

Possible imports of vanadium or vanadium ores into Canada are not shown separately in Canadian trade reports. Metal and Mineral Markets—New York—quoted ferrovanadium, June, 1943—per pound of vanadium contained, delivered \$2.75 to \$2.90. Vanadium ore per pound V₂O₅ contained, 27½ cents f.o.b. shipping point.

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec.

Zircon is used to a steadily growing extent in refractories, specialized porcelains and heat-resisting glass.

New York quotations for zirconium alloy—July, 1943 were: 12 to 15 per cent Zr, 39 to 43 per cent Si, \$102.50 to \$107.50 per gross ton; 35 to 40 per cent Zr, 47 to 52 per cent Si, 14 to 16 cents per pound. Zirconium per pound commercially pure, powdered \$7. Zircon ore—per ton f.o.b. Atlantic seaboard, minimum 55 per cent ZrO_2 \$60 to \$70.

Table 132.—Principal Statistics (*) of the Miscellaneous Metal Mining Industry in Canada, 1941 and 1942

	1941	1942
Number of firms.....	46	68
Capital employed (**)... \$	2,931,695	3,956,427
Number of employees—On salary.....	78	191
On wages.....	647	1,161
Total.....	725	1,352
Salaries and wages—Salaries..... \$	149,149	286,932
Wages..... \$	992,095	2,109,799
Total..... \$	1,141,244	2,396,731
Value of production (gross)..... \$	3,428,886	5,516,241
Cost of fuel and electricity..... \$	359,005	623,665
Process supplies used..... \$	217,494	600,900
Smelter charges..... \$		33,910
Freight..... \$	233,904	261,211
Value of production (net)..... \$	† 2,618,483	3,996,555

(*) Does not include data relating to smelters and refineries or to pitchblende mining in the Northwest Territories.

(**) Exclusive of ore reserves.

† Revised.

Table 133.—Capital Employed in the Miscellaneous Metals Mining Industry in Canada, 1942

	\$
Present cash value of the land (excluding minerals).....	787,413
Present value of buildings, fixtures, machinery, tools and other equipment.....	2,423,881
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	334,359
Inventory value of finished products on hand.....	45,446
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	365,328
Total.....	3,956,427

Table 134.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1942

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total.....	169	22	286,932
Wage-earners—			
Surface.....	665		2,109,799
Underground.....	355		
Mill.....	141		
Total.....	1,161		2,109,799
Grand Total.....	1,330	22	2,396,731

Table 135.—Average Number of Wage-Earners Employed, by Months, 1939-1942

	1939	1940	1941	1942		
				Surface	Under-ground	Mill
January.....	144	296	415	441	250	92
February.....	143	253	415	459	271	96
March.....	166	244	501	439	306	113
April.....	190	307	533	454	320	132
May.....	226	370	599	473	313	125
June.....	289	390	704	579	315	130
July.....	310	435	749	655	346	151
August.....	377	417	776	778	341	163
September.....	376	450	822	817	362	165
October.....	394	475	799	862	429	172
November.....	425	410	774	959	461	182
December.....	415	368	659	980	538	160

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

The Non-ferrous smelting and refining industry, as defined by the Dominion Bureau of Statistics, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The net value added by the industry in the processing of crude or semi-crude material during 1942 totalled \$125,881,047 compared with \$119,736,294 in the preceding year. Refined products included gold, silver, nickel, copper, lead, zinc, aluminium, tin, magnesium, indium, antimony, bismuth, cobalt, cadmium, selenium, tellurium, pitchblende products and sulphur; other end products of individual plants or companies were copper-nickel matte, cobalt salts, nickel salts, nickel and cobalt oxides, arsenious oxide, sulphuric acid, platinum metals residues, zinc dust, zinc oxide, and blister and anode copper.

The net value added by the industry in the treatment of various ores, metals, etc., in 1942 represents a 5 per cent increase over the all-time high record of \$119,736,294 established in 1941. This continued increase realized by the smelters and refineries reflects Canada's unabated effort to provide, to her full capacity, the essential materials for the successful waging of a total war. The production of the light metals was particularly impressive—aluminium output was far greater than in the previous year and the recovery of magnesium metal reached an important volume. The greater part of the production of this latter metal comes from the new plant of Dominion Magnesium Ltd. It is also worthy of note that the commercial recovery of indium in Canada was recorded for the first time in 1942. Not included with the products credited to the non-ferrous smelting and refining industry was an important production of quicksilver in British Columbia. This metal is produced at or near the mines and statistics relating to its production are included with those of the miscellaneous metal mining industry. The production of chrome-bearing ferro-alloys in Ontario, principally from foreign ores, is classified under manufacturing and the data relating to same are therefore not included in this chapter.

The total cost of ores, concentrates, matte and other material treated in all Canadian non-ferrous metallurgical plants during 1942 was estimated at \$258,903,818 compared with \$213,542,005 in 1941. In this regard, it should be noted that companies operating both mines and smelters may vary from year to year the nominal values of crude ores, etc., shipped from their mines to their own smelters, with the result that in some years the mining industry proper is favoured at the expense of the non-ferrous smelting and refining industry and vice versa. The total annual net income of the nation as a whole is, however, not affected by these arbitrary (internal) evaluations. Fuels and purchased electricity consumed by the industry in 1942 totalled \$35,748,639 and the value of chemicals and various other process supplies used amounted to \$27,083,695.

Capital employed in 1942 was reported at \$356,052,965, which figure includes the value of land, plant, materials on hand and in process, finished products and operating funds. Employees totalled 21,162 compared with 16,014 in 1941 and salaries and wages aggregated \$37,340,556 as against \$27,482,689 in the preceding year. Female wage-earners in 1942 averaged 185.

Table 136.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1940-1942

	1940	1941	1942
Number of companies.....	9	9	10
Number of plants.....	13	13	15
Capital employed.....	\$ 234,826,742	309,963,342	356,052,965
Number of salaried employees.....	1,558	1,750	2,625
Salaries.....	\$ 3,661,048	4,117,398	5,286,755
Number of wage-earners.....	11,908	14,264	18,537
Wages.....	\$ 18,105,149	23,365,291	32,053,801
Value of plant products (gross) (*).....	\$ 305,360,547	379,322,270	447,617,199
Estimated cost of ores, concentrates, etc., treated (a).....	\$ 174,274,655	213,542,005	258,903,818
Cost of fuel and purchased electricity (b).....	\$ 19,510,664	26,771,809	35,748,639
Process supplies, other than items (a) and (b).....	\$ 13,515,941	19,272,162	27,083,695
Value added by smelting (net).....	\$ 98,059,287	119,736,294	125,881,047

(*) The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industry (smelting, refining, etc.) end products (blister, copper matte, etc.)

Table 137.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1942

	\$
Present cash value of the land (excluding minerals).....	3,452,543
Present value of buildings, fixtures, machinery, tools and other equipment.....	226,904,716
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	60,229,508
Inventory value of finished products on hand.....	6,451,828
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	59,014,370
Total.....	356,052,965

Table 138.—Number of Wage-Earners, by Months, 1932 and 1939-1942

Month	1932	1939	1940	1941	1942	
					Male	Female
January.....	5,496	11,138	11,225	12,927	15,778	31
February.....	5,400	11,123	11,297	13,052	16,298	32
March.....	5,355	11,334	11,298	13,102	16,434	34
April.....	4,750	11,371	11,403	13,617	16,617	39
May.....	4,297	11,380	11,691	14,275	17,223	53
June.....	4,475	11,390	11,794	14,503	18,297	68
July.....	4,205	11,486	12,102	14,634	18,900	75
August.....	4,160	11,476	12,256	14,788	19,346	81
September.....	4,198	11,454	12,251	14,815	19,091	206
October.....	4,326	11,327	12,316	14,995	20,076	424
November.....	4,316	11,401	12,481	15,055	20,953	570
December.....	4,274	11,424	12,771	15,371	21,239	605
Average.....	4,604	11,360	11,908	14,264	18,352	185

The agreement made in 1939 by the large base metal producers and the Imperial Government, by which the producers were to supply the Imperial Government with copper, lead and zinc at prices which prevailed shortly before the outbreak of the war, was continued with some adjustments or revisions for increases in prices due to the increased cost of labour and materials. Canada can now furnish large quantities of these metals in the refined state, whereas in 1914 no refined copper, nickel or zinc and only a comparatively small amount of refined lead were produced in this country.

Tables of world metal production were omitted from this report due to the fact that recent data for most countries were unobtainable or conjectural in nature; also, data relating to capacities of Canadian metallurgical plants have been withheld for confidential use only until the termination of the war.

The following information has been abstracted from the 1942 annual reports of some of Canada's more important mining and metallurgical companies:

Falconbridge Nickel Mines Ltd.—"Full effect of the expansion program commenced in 1941 was not realized until the end of the second quarter when it was finally completed. However, full advantage was taken of all units as they became available and the substantial increase shown in ore treated and metals produced records the greatest production effort of any year in the history of the company.

"Early in 1942, after fully exploring the possibilities, it was decided to further increase the production capacity by additions to the smelting plant. It was hoped that the second project could be completed by the end of the year but unexpected delays have upset the schedule to such an extent that little gain can be expected from it before the end of the first quarter of 1943."

International Nickel Company of Canada Limited.—"All of the Company's works ran continuously throughout the year and considering the shortage of labour and the difficulty in securing supplies, the operating results were satisfactory.The expanded production of nickel already attained, coupled with conservation in its applications and organized salvage of nickel-bearing scrap, has eased a threatened shortage of supply. It would now appear that a sufficient tonnage of this strategic metal is available to meet all vital requirements of our armed services. While in no way lessening its war efforts, the Company has long been formulating plans in preparation for the post-war period."

Noranda Mines Limited.—"Production at the Horne mine was at full capacity as permitted by sound and safe mining practice and limitations of the capacity of the smelter and of the customs refinery operated at Montreal East by the Company's subsidiary, Canadian Copper Refiners Limited. Since the commencement of the war, the production of copper and zinc by another subsidiary, Waite-Amulet Mines Limited, has been greatly expanded and the combined copper-zinc production of Noranda and Waite-Amulet has been a very important contribution to Canada's war effort. The copper refinery at Montreal East operated at full capacity during 1942. The estimated copper and gold content of the ore indicated in the Horne mine above the 2,975 foot level, as of January 1, 1943, is sufficient to maintain production of these metals for fifteen years at the 1942 rate of production."

Hudson Bay Mining & Smelting Co. Limited.—"The capacity of the copper smelter was further increased during 1942. The tonnage of pay charge of Hudson Bay material and of customs ore and concentrates was an all-time high, and the year's production of gold, silver, and copper from all sources reached a new peak. A fifth copper roaster was installed and placed in operation early in May.

"There were slight increases in the tonnage of zinc concentrates treated, the average zinc assay per ton of zinc concentrates treated, and the percentage of recovery of zinc from concentrates treated to slab zinc produced. The year's production of slab zinc was the highest on record. The cadmium plant treated all available precipitates from the zinc purification plant. The cyanide plant again treated a greater tonnage of flotation tailings than had been treated in any previous year. Women are now being employed on various types of work in the metallurgical and other surface plants and over 200 farmers worked for the company during the winter."

Consolidated Mining & Smelting Co. of Canada Limited.—"The metallurgical and chemical plants at Trail, British Columbia, were operated in 1942 at full capacity. Recoveries were satisfactory, but costs were slightly higher.

"The cooperation of the company was invited by the British and Dominion Governments in connection with the production of certain chemicals for war purposes. The company's directors agreed to place at their disposal all technical and engineering information in possession of the company, together with such facilities as might be required to plan, construct and operate these plants on the basis of actual cost. Expenditures amounting to approximately \$16,000,000 were undertaken. Construction estimates were not exceeded and operations were commenced within the time specified. It is a matter of much satisfaction to record that production has been greater than rated capacity and costs per unit below estimates. The construction and operation contracts with the governments in connection with these plants do not include any remuneration to the company. . . . Most of the company's production of lead and zinc were still under contract to the British Government. The balance of the output, together with the company's other metal and fertilizer production, was practically all required directly or indirectly for war purposes."

The Aluminum Company of Canada Limited reported continuous operations throughout 1942 at its Arvida ore plant and at both the Arvida and Shawinigan Falls reduction plants. The new reduction plant of the company at La Tuque, Quebec, came into production in November.

At Deloro, Ontario, the plant of the Deloro Smelting & Refining Company Limited was operated steadily during the year under review. The company treated both Canadian and foreign ores and products included silver, arsenic and cobalt and nickel in various forms.

Dominion Magnesium Limited conducted operations at its new property located near Renfrew, Ontario, from August; magnesium metal is produced in the company plant by the ferrosilicon process. The metal is recovered from dolomite rock which is quarried near the plant.

Operations at the refinery of Eldorado Gold Mines Limited, located at Port Hope, Ontario, were continuous throughout 1942. Pitchblende concentrates shipped from the company's mine situated at Great Bear Lake, Northwest Territories, are treated in this Port Hope refinery.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada.

The Coke and Gas Industry in Canada.

The Peat Industry in Canada is included under non-metals, chapter 8.

The Petroleum Industry in Canada.

1. Production of Crude Petroleum.
2. Production of Petroleum Products.

NOTE:—In order to correlate data regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, and petroleum industries. This survey presents information regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

The Bureau issues an annual report on Coal Statistics for Canada which may be referred to for complete details of the Coal Mining Industry.

THE COAL MINING INDUSTRY

Dominion Fuel Board—The Board was created in 1922 to meet the need for a permanent organization responsible to the Government for a thorough and systematic study of the fuel situation and recurrent shortages experienced throughout Canada. It is composed of permanent members of the Dominion Civil Service and the staff of the Board constitutes a division of the Bureau of Mines and Geology, Department of Mines and Resources.

In recent years the policy of the Government has been to extend the market for Canadian coal and to that end financial assistance in the form of subventions has been given to the coal industry since 1928, the Board being responsible for the administration of subvention payments. The amount of coal moved under these assisted rates increased from 146,126 short tons in 1928 to a maximum of 3,403,581 short tons in 1939 and was 1,091,887 net short tons in 1943. Of the total moved under assisted rates in 1943, 809,161 short tons were from Nova Scotia and New Brunswick and 282,726 short tons from Western Canada.

The Dominion Fuel Board also administers the Domestic Fuel Act (17 Geo. V, c. 52) authorizing a bonus on Canadian coal converted to coke and sold for domestic use, and, from April 1, 1941, the Act (20-21 Geo. V, c. 6) to place Canadian coal used in the manufacture of coke for metallurgical purposes upon a basis of equality with imported coal.

Coal Administration—Since the outbreak of war, the Dominion Fuel Board has collaborated closely with the Coal Administrator of the Wartime Prices and Trade Board, and on Aug. 6, 1941, the Coal Administrator took over, for the duration of the War and until further order, the powers, duties, functions, staff and establishment of the fuel Board.

In December, 1942, P.C. 10674 was passed establishing the Emergency Coal Production Board. On this Board the Coal Administrator acted as Chairman.

Coal Control.—Order-in-Council P.C. 1752 of March 5, 1943, transferred the Coal Administration from the Wartime Prices and Trade Board, Department of Finance, to the Department of Munitions and Supply and the Coal Control was created. The duties and functions of the Coal Control in general are to study the production and importation of coal into Canada and to maintain an equitable distribution thereof; to regulate and maintain price control and prevent infraction of the price ceilings, and to carry on the powers and duties of the Dominion Fuel Board.

The Emergency Coal Production Board formerly under Department of Finance also was transferred to Department of Munitions and Supply, by Order-in-Council 1752, dated March 5, 1943. During 1943 the Emergency Coal Production Board actively assisted coal mine operators where necessary in maintaining and increasing production, either through production subsidy or by financial assistance in the form of loans or grants. Also initiated and financed by the Board were six stripping operations in Alberta which were to provide a reserve to meet emergencies. It was also instrumental in the re-opening of a large stripping operation in southern British Columbia.

The Board, in co-operation with the Department of Mines in Quebec, assisted in developing small local peat fuel production operations in various parts of the Province, and assisted them financially.

Expenditures for these purposes since the inception of the Board up to the end of 1943, amounted to \$4,624,908.

The fuel situation in Canada is somewhat anomalous, as, in spite of the enormous resources of coal in the country, about 50 per cent of the requirements is imported. The Canadian coal areas are situated in the eastern and western provinces, while the areas of densest population and greatest industrial development, in Ontario and Quebec, are more easily and economically supplied with coal from the nearer coalfields of Pennsylvania and Ohio.

Canadian coal exported in 1942 amounted to 815,585 tons, compared with 531,449 tons in 1941. Ports in Nova Scotia, New Brunswick, Quebec and central Ontario cleared 505,578 tons of Canadian coal and exportations through western ports reached 310,007 tons.

Imports of coal into Canada in 1942 were 17 per cent higher at 25,609,267 tons. Anthracite imports amounted to 4,802,023 tons and consisted of 4,422,499 tons from the United States and 379,524 tons from Great Britain. The United States supplied 92 per cent of Canadian anthracite requirements in 1942 compared with 84 per cent in the preceding year. Great Britain supplied 8 per cent of Canada's requirements of this coal during the year as against 16 per cent in 1941. Receipts of bituminous coal totalled 20,807,005 tons or 16.4 per cent above the 1941 total. Lignite coal imports amounted to just 239 tons in 1942.

Production of coal in Canada during 1942 totalled 18,865,030 short tons valued at \$62,897,581 compared with 18,225,921 short tons worth \$58,059,630 in 1941. The quantity produced in 1942 established an all-time high record; however, the value of same was surpassed in each of the years 1920, 1921, 1922, 1923, 1928 and 1929. The 1942 output comprised 13,616,215 tons of bituminous, 733,547 tons sub-bituminous and 4,515,268 tons of lignite. Of the total Canadian output in 1942, Nova Scotia mines contributed 7,204,852 tons; New Brunswick 435,203 tons; Manitoba, 1,265 tons; Saskatchewan 1,301,116 tons; Alberta 7,754,053 tons and British Columbia 2,168,541 tons.

The rough average British Thermal Unit values per pound of Canadian coals delivered to consumers (1941) was estimated by the Department of Mines and Resources, Ottawa, as follows:—Bituminous—Maritime Provinces, British Columbia and Alberta, grade I—14,000; grade 2, 13,000 and grade 3, 11,000 to 12,000. Sub-bituminous—Alberta and British Columbia, 10,000 to 11,500. Lignite—Domestic, Alberta and British Columbia, 7,500 to 10,000. Lignite—Saskatchewan, 6,500 to 7,500.

The entire coal mining industry of Canada provided employment for 26,194 persons and distributed \$42,091,137 as salaries and wages in 1942. During the year under review every effort was made by the Government and the operators to sustain and increase the trained personnel at the mines. The only serious labour difficulty experienced was a week long strike of miners in Cape Breton; this commenced on April 14.

The production of coal in Canada is confined to the western and eastern provinces. Ontario and Quebec have no commercial coal mines and the production of coal in Manitoba is limited to a small tonnage of lignite.

Nova Scotia produces bituminous coal from Cape Breton Island and the mainland collieries in the Cumberland and Pictou areas. New Brunswick produces at Minto a small portion of the bituminous coal of Eastern Canada. Lignite is produced in Saskatchewan, the main producing areas being the Bienfait and Estevan divisions.

Alberta produces all ranks of coal, including sometimes a small tonnage of anthracite coal. Bituminous coal is produced in the Crownsnest field and the mining areas of the foothills. The coal mined in the central area of the province is lower in rank and is classed as sub-bituminous and domestic or lignite.

British Columbia produces bituminous and sub-bituminous coal from Vancouver Island, the Crew's Nest area, which is adjacent to the Alberta field, and also from the inland area located near the towns of Princetown and Merritt.

The major portion of the coal produced in Canada is mined in Nova Scotia and Alberta, the production from each of these areas being approximately 40 per cent of the total production for Canada.

The coal production from Nova Scotia, augmented by a small tonnage from New Brunswick, provides, in peacetime, not only for the requirements of the railways of the area, the steel industry and the domestic market, but also for much of the fuel requirements of the Province of Quebec and, to a lesser degree, Ontario. The increasing wartime expansion of industry and transportation during 1942 however, considerably reduced the movement of coal from this area.

The development of markets in Ontario for Alberta coal has also been discontinued due to the increased demand in the western provinces.

The output from most of the Canadian collieries for 1942 has been increased and development work undertaken to increase production and in a measure offset the adverse effect of the reduction in manpower. A major development of the year was the construction of the Elk Colliery near Fernie, B.C. to replace the operations of the Coal Creek Colliery which are to be abandoned.

Table 139.—Capital Employed in the Coal Mines of Canada, by Provinces, 1941 and 1942

Province	1941				1942			
	Capital employed as represented by:				Capital employed as represented by:			
	Cost of land, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total	Cost of land, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
	\$	\$	\$	\$	\$	\$	\$	\$
Nova Scotia.....	33,003,311	2,973,555	7,170,721	43,147,587	31,838,558	2,964,078	10,034,232	44,836,868
New Brunswick...	894,214	57,566	526,292	1,478,072	849,793	46,722	489,914	1,386,429
Manitoba.....	2,500	100	500	3,100	2,500	100	500	3,100
Saskatchewan.....	2,982,495	98,898	447,786	3,529,179	2,718,086	136,398	428,553	3,283,037
Alberta.....	29,092,375	966,049	6,705,091	36,763,515	28,945,543	1,165,047	7,327,893	37,438,483
British Columbia..	19,311,940	367,967	1,896,996	21,576,903	20,045,265	372,650	1,400,565	21,818,780
Canada.....	85,286,835	4,464,135	16,747,386	106,498,356	84,399,745	4,684,995	19,681,957	108,766,697

Table 140.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1942

Province	Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages
	Male	Female	Surface	Under-ground			
						\$	\$
Nova Scotia.....	435	129	2,116	10,450	13,130	1,142,691	19,539,546
New Brunswick.....	43	6	319	714	1,082	105,559	1,143,562
Manitoba.....			1	2	3		1,703
Saskatchewan.....	38	6	252	340	636	93,140	729,066
Alberta.....	505	40	2,159	5,840	8,544	1,250,161	13,456,602
British Columbia.....	202	27	689	1,881	2,799	550,048	4,079,059
Canada 1942.....	1,223	208	5,536	19,227	26,194	3,141,599	38,949,538
Canada 1941.....	1,228	124	5,372	19,608	26,330	2,844,053	35,305,549

Table 141.—Wage-earners Employed and Days' Work Done, by Months, in the Coal Mines of Canada, 1942, with Comparative Totals for 1941

Month	Number of wage-earners			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	5,898	21,733	27,631	149,650	498,969	648,619
February.....	5,768	21,348	27,116	134,234	461,201	595,435
March.....	5,542	20,314	25,856	135,511	451,071	586,582
April.....	5,319	19,237	24,556	126,244	428,410	554,654
May.....	5,249	18,313	23,562	122,659	383,120	505,779
June.....	5,393	18,803	24,196	127,330	388,314	515,644
July.....	5,470	18,618	24,088	133,250	422,320	555,570
August.....	5,428	17,987	23,415	135,450	410,348	545,798
September.....	5,401	17,698	23,099	133,376	396,021	529,397
October.....	5,480	17,927	23,407	136,043	413,764	549,807
November.....	5,664	19,077	24,741	139,401	428,323	567,724
December.....	5,822	19,666	25,488	144,512	450,051	594,563
Total for 1942.....				1,617,666	5,131,912	6,749,572
Total for 1941.....				1,542,056	5,111,559	6,653,615

Table 142.—Output of Coal in Canada, by Grades, 1918-1942

Calendar year	Anthracite		Bituminous		Sub-Bituminous*		Lignite		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$		\$		\$
1918.....	115,405		11,636,190				3,226,331		14,977,926	55,192,896
1919.....	85,579		10,892,046				2,941,471		13,919,096	55,622,670
1920.....	127,513		13,122,924				3,696,327		16,916,764	82,496,538
1921.....	96,964	330,699	11,680,477	58,848,444			3,280,527	13,272,513	15,057,496	72,451,656
1922.....	40,417	122,538	11,630,488	53,348,507			3,480,526	12,047,452	15,157,441	65,518,497
1923.....	107	322	12,941,877	58,478,670	466,492	1,399,424	3,582,095	12,180,570	16,990,574	72,058,986
1924.....			9,483,732	40,662,894	590,168	1,761,086	3,564,297	11,170,008	13,638,197	53,593,989
1925.....			8,939,607	36,793,501	570,654	1,731,267	3,624,707	10,737,183	13,134,968	49,261,951
1926.....			12,393,079	48,153,572	489,736	1,458,116	3,595,316	10,263,406	16,478,131	59,875,094
1927.....			13,006,996	49,385,818	596,155	1,784,973	3,823,710	10,696,672	17,426,861	61,867,463
1928.....			12,971,744	50,584,108	740,496	2,076,212	3,852,053	11,097,513	17,561,296	63,757,533
1929.....			12,859,822	49,995,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170
1930.....			10,824,839	41,789,061	603,358	1,705,236	3,453,127	9,355,451	14,881,324	52,849,748
1931.....			8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,755	12,244,211	41,207,682
1932.....			7,714,279	28,073,744	560,902	1,329,316	3,463,732	7,714,635	11,738,913	37,117,695
1933.....			7,979,283	27,757,150	554,118	1,274,017	3,369,943	6,892,795	11,903,344	35,923,962
1934.....			10,058,782	34,356,274	537,508	1,256,936	3,213,903	6,432,732	14,810,194	42,045,912
1935.....			9,748,841	33,150,781	566,425	1,410,926	3,572,740	7,401,403	13,888,006	41,963,110
1936.....			10,796,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,188	45,791,934
1937.....			11,634,379	39,661,259	506,260	1,314,196	3,695,315	7,776,593	15,835,954	48,752,048
1938.....			10,329,782	35,403,781	488,915	1,269,131	3,476,021	7,309,259	14,494,718	43,982,171
1939.....			11,769,296	40,119,905	512,101	1,323,401	3,411,301	7,233,634	15,692,698	48,676,990
1940.....			13,333,037	45,350,950	598,686	1,569,771	6,035,161	7,755,123	17,566,884	54,675,844
1941.....			13,603,307	47,391,274	585,453	1,593,549	4,037,161	9,074,807	18,225,924	58,059,193
1942.....			13,616,215	49,730,504	733,547	2,100,889	4,515,268	11,066,188	18,865,030	62,897,581

*Not separately reported prior to 1923.

Table 143.—Output and Value of Coal in Canada, by Kinds and Provinces, 1941 and 1942

(Short tons)

Province	1941			1942		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	38	7,387,762	28,446,204	36	7,204,852	29,116,118
NEW BRUNSWICK (Bituminous).....	34	523,344	2,021,394	36	435,203	1,826,403
MANTOBA (Lignite).....	1	1,246	3,411	1	1,265	3,763
SASKATCHEWAN (Lignite)*.....	102	1,322,763	1,713,478	82	1,301,116	1,760,065
ALBERTA—						
Bituminous.....	14	3,671,357	10,431,004	15	3,807,619	11,221,161
Sub-bituminous.....	13	585,453	1,593,549	13	733,547	2,100,889
Lignite.....	191	2,713,152	7,357,918	164	3,212,887	9,302,360
Total†.....	218	6,969,962	19,382,471	192	7,754,053	22,624,410
BRITISH COLUMBIA (Bituminous).....	26	2,020,844	6,492,672	29	2,168,541	7,566,822
YUKON (Bituminous).....						
CANADA—						
Bituminous.....	112	13,603,307	47,391,274	116	13,616,215	49,730,504
Sub-bituminous.....	13	585,453	1,593,549	13	733,547	2,100,889
Lignite.....	294	4,037,161	9,074,807	247	4,515,268	11,066,188
Total.....	419	18,225,921	58,059,630	376	18,865,030	62,897,581

*Exclusive of 25 small mines in operation during part of 1941 and 30 small mines operating during part of 1942.

†Exclusive of 24 small mines operated under special permits in 1941 and 13 small mines in 1942.

THE COKE AND MANUFACTURED GAS INDUSTRY, 1942

Production from coke plants and from illuminating and fuel gas plants in Canada during 1942 was valued at \$55,788,491. This output was 9.7 per cent above the \$50,818,720 of the previous year and set a new record for the industry. Output for the year under review included 3,265,549 tons of coke valued at \$27,711,673 at the works, 68,839,292 M cubic feet of gas of which 67,755,949 M cubic feet valued at \$23,466,041 were sold or used, and by-products valued at \$4,610,777.

Twenty-eight coke and gas works operated in 1942, including 10 by-product and bee-hive plants and 18 retort coal and water gas plants. Fourteen of these works were located in Ontario, 4 in British Columbia, 4 in Quebec, 2 in Manitoba, 2 in Nova Scotia, and 1 in each of New Brunswick and Alberta. In addition to these producers, 1 company in Quebec and 2 in Ontario purchased coke-oven gas and distributed it for domestic or commercial use and data covering their operations have been included to round out the figures for the industry.

Output of coke from gas retorts, by-products and bee-hive ovens totalled 3,265,549 tons in 1942 compared with 3,145,715 tons in 1941 and 3,015,394 tons in 1940. By-product and bee-hive ovens produced 2,966,983 tons of coke in 1942 and gas retorts made 298,566 tons. In addition, 73,411 tons of petroleum coke were recovered in petroleum refineries and 17,234 tons of pitch coke in coal tar distillation plants.

Data on the distribution of coke (except petroleum and pitch coke) by the producers show that 176,865 tons were sold direct to domestic consumers; 1,744,106 tons were used in metallurgical works operated by the producing companies; 275,790 tons were used by coke plants as fuel or to make water gas; 77,308 tons were sold direct to consumers for foundry and other uses (other than domestic); 387,749 tons were sold to dealers for resale, and 42,374 tons were sold for export. The total distribution was 3,549,078 tons, including about 132,000 tons withdrawn from producers' stocks during the year, and imports by the producers of 168,000 tons. Total stocks of coke in the hands of producers amounted to 83,469 tons at the end of 1942.

Imports into Canada of coke made from coal increased to 719,910 tons in 1942 from 614,417 tons in 1941, and exports increased to 44,764 tons from 40,167 tons. Imports of petroleum coke during this period rose to 312,917 tons from 235,852 tons and exports (including re-exports of imported coke) declined to 53,080 tons from 67,738 tons.

Manufactured gas, sold and used, amounted to 67,775,949 M cubic feet in 1942, including 51,143,019 M cubic feet from by-product ovens and 16,612,930 M cubic feet from gas plants. Sales of gas by the producers totalled 18,913,230 M cubic feet, of which 11,041,002 M cubic feet were from by-product ovens and 7,872,228 M cubic feet were from gas works. Most of the remaining gas was used as fuel in the producing plants or in their associated metallurgical works. These figures do not include 49,962 M cubic feet of (Pintsch) oil gas for lighting railway cars, 7,843,715 M cubic feet of still gas recovered at petroleum refineries, nor iron blast furnace gas and some producer gas which was recovered and used by the producers but for which no records are available.

The number of customers served with manufactured illuminating and fuel gas in 1942 was 497,903; the number of active meters was 521,793; the length of distributing mains was 3,870 miles, and the average calorific value of the gas sold ranged from 450 to 570 B.T.U. per cubic foot.

Table 144.—Materials Used in Coke and Gas Plants, 1941 and 1942

Material	1941		1942	
	Quantity	Cost at works	Quantity	Cost at works
Bituminous coal carbonized in ovens or retorts—		\$		\$
(a) Canadian.....	1,434,215	6,237,832	1,487,994	6,835,656
(b) Imported.....	2,884,107	15,805,353	2,979,867	17,617,276
Bituminous coal for making water gas—				
Imported.....	3,522	34,463	4,030	35,985
Coke for gas-making—				
(a) Purchased.....	7,447	75,197	9,356	97,281
(b) Companies' own make.....	84,331	630,176	128,777	1,104,075
Oil used for enriching water gas.....	5,204,117	329,986	7,772,275	593,015
Absorbing and wash oil.....	255,563	30,926	276,019	36,317
Caustic soda.....	1,592,879	33,462	2,014,886	39,042
Lime.....	2,613	27,935	2,517	27,427
Water.....		18,836		24,325
Iron oxide.....	8,574	36,480	4,600	33,790
Sulphuric acid, 66° Bé.....	47,693,474	473,238	64,114,815	493,332
All other materials.....		173,994		356,984
Total Cost.....		23,907,878		27,294,505

Table 145.—Products Made in Coke and Gas Plants, 1941 and 1942

Product	Unit of measure	1941		1942	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
GAS MADE—					
Retort coal gas.....	M cu. ft.	5,662,989		5,131,152	
Coke oven gas.....	M cu. ft.	40,143,240		43,228,790	
Producer gas.....	M cu. ft.	9,415,880		16,171,807	
Water gas.....	M cu. ft.	2,498,003		4,248,453	
Propane gas.....	M cu. ft.	8,691		59,090	
Total Gas Made.....	M cu. ft.	57,728,803		68,839,292	
GAS SOLD OR USED—					
Gas sold.....	M cu. ft.	16,931,434	15,888,723	18,913,230	17,316,135
Gas used in own coke of gas plants.....	M cu. ft.	23,480,119	3,052,823	25,212,211	3,405,110
Gas used in associated metallurgical works.....	M cu. ft.	13,352,389	1,636,603	21,840,825	1,837,253
Gas otherwise accounted for but not sold.....	M cu. ft.	2,355,672	122,761	340,132	81,409
Gas not accounted for.....	M cu. ft.	1,368,490	856,218	1,449,551	826,134
Total Gas Sold or Used.....	M cu. ft.	57,477,104	21,557,128	67,755,949	23,466,041
COKE MADE—					
Coke from by-product or bee-hive ovens.....	ton	2,680,771	21,808,129	2,795,658	24,284,665
Coke from gas retorts.....	ton	280,728	2,362,880	284,314	2,668,673
Coke breeze from by-product ovens.....	ton	166,853	676,466	171,325	719,400
Coke breeze from gas retorts.....	ton	17,363	40,548	14,252	38,935
Total Coke.....	ton	3,145,715	24,888,023	3,265,549	27,711,673
OTHER PRODUCTS—					
Tar.....	Imp. gal.	33,375,297	1,902,394	34,286,913	1,994,224
Ammonia liquor.....	NH ₃	1,922,682	19,210	1,713,085	18,079
Ammonium sulphate.....	pound	70,786,432	1,036,095	72,398,424	1,055,868
Benzol.....	Imp. gal.	6,031,137	723,608	5,999,085	797,257
Toluol, xylol and naphthalene.....	Imp. gal.	1,990,910	686,649	2,004,006	708,949
All other products.....			5,613		36,400
Grand Total.....			50,818,720		55,788,491

THE NATURAL GAS INDUSTRY

Production of natural gas in Canada during 1942 totalled 45,697,359 thousand cubic feet valued at \$13,301,655 compared with 43,495,353 thousand cubic feet worth \$12,665,116 in 1941; of the 1942 output, New Brunswick contributed 619,380 M cu. ft.; Ontario 10,476,770 M cu. ft.; Saskatchewan 117,124 M cu. ft.; Alberta 34,482,585 M cu. ft., and Northwest Territories 1,500 cu. ft. Production data as thus recorded includes only the natural gas consumed for industrial and domestic purposes and does not take into account the waste gas burned in the Turner Valley field of Alberta.

Natural gas has been found in most of the provinces of Canada. It is produced commercially in abundance in Alberta and Ontario, and in smaller quantities in New Brunswick, Saskatchewan and Quebec. The Bureau of Mines, Ottawa, reviewed the natural gas industry in 1942 as follows:

"In Alberta, most of the production comes from the Turner Valley Field, which supplies fuel for the field itself, and then feeds the pipe line to the cities and districts of Calgary and Lethbridge. It has not been necessary to drill gas wells for some years, and production is now largely derived from the oil wells in which the gas plays a vital role in the production of oil. The gas-oil ratio of many of these, particularly in the southern part of the field, where conservation measures had not been fully developed until after the wells had been some time in production, has risen so that in some cases wells have had to be re-classified as gas wells, thus adding to the reserve of gas. Production of gas is still much in excess of consumption, although the large amount wasted was reduced by nearly one-third in 1942. With further improvements in conservation, particularly should the experiment in re-cycling gas, started in December, prove successful, the waste is likely to continue to decline. Although the use of gas for fuel increased considerably owing to war demand, the more efficient operation of Turner Valley oil wells enabled the average daily production to be reduced.

"The Edmonton area is supplied from the gas field at Viking, about 80 miles south east of the city, supplemented by that at Kinsella farther east. The latter field was discovered in 1929, and was first connected by an extension of the pipe line in the fall of 1940. The duplicate 12 $\frac{3}{4}$ " line from Viking to Edmonton was not completed for lack of pipe. During 1942 three wells were drilled at Kinsella, and at the close of the year six wells were producing and the field thus became the principal producer. Medicine Hat and the adjacent town of Redcliff are supplied from the Medicine Hat field, where one well was drilled. The Vermilion field became an important producer of natural gas in 1942, the quantity produced being about the same as that of the Fabyan field, which supplies Wainwright. The output from the Brooks and Foremost fields was obtained from several small producers.

"In Saskatchewan, the eastern part of the Lloydminster field supplies the town of the same name. In the Kamsack area, two new wells were drilled, one well was deepened to 1,210 feet, and another from 1,575 feet to 1,753 feet. A total of 36 wells have been drilled in this field, mostly to depths around 200 feet, and they yield from 15 M to 250 M cubic feet at a closed-in pressure of 36 pounds. Much geophysical and geological work was done during 1942 and previously, principally in the area running diagonally from the southeast corner of the province in a north-westerly direction to about 50 miles north of Lloydminster, the purpose being the discovery of either gas or oil. Deep tests have, however, so far failed to disclose accumulations of gas in commercial quantities.

"In Ontario, natural gas is produced commercially only in the south-western part of the province, the principal fields being Tilbury, Haldimand, Dawn, De Clute, Brownsville, Dover, Norfolk, Welland, Onondaga, and Malahide.

"In Quebec, natural gas is produced in small quantities at several wells along the St. Lawrence River and is used locally.

"In New Brunswick, the Stoney Creek field supplies Moncton and Hillsborough with natural gas. Two new wells were drilled and five were deepened, one of which was abandoned owing to mechanical difficulties, and another showed no increase. The total new production, measured in terms of initial flush production, amounted to 21,862 M cubic feet. The total production for the year was 619,380 M cubic feet. A geophysical traverse was run across the field from well 47 to well 128, and continued to Albert mine. The results show the desirability of further work of this nature."

Dividends paid in 1942 by Ontario natural gas producing companies totalled \$91,573 and the total dividends paid by these same firms to the end of 1942 aggregated \$5,208,446.

Table 146.—Production of Natural Gas in Canada, by Provinces, 1931-1942

Year	New Brunswick		Ontario		Manitoba		Alberta	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$
1931.....	655,891	323,184	7,419,534	4,635,497	600	180	17,798,698	4,067,893
1932.....	662,452	326,191	7,386,154	4,719,297	600	180	15,370,968	3,853,794
1933.....	618,033	302,706	7,166,659	4,523,085	600	180	15,352,811	3,886,263
1934.....	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436
1936.....	606,246	298,819	10,006,743	6,052,294	600	180	17,407,820	4,376,720
1937.....	576,671	283,922	10,746,334	6,588,798	600	180	20,955,506	4,766,437
1938.....	577,492	284,689	10,952,806	6,460,764	600	180	21,822,108	4,807,346
1939.....	606,382	292,403	11,966,581	7,261,928	600	180	22,513,660	4,915,821
1940.....	616,041	300,543	13,053,403	7,745,834	600	180	27,459,808	4,923,469
1941.....	653,542	317,437	11,828,703	7,140,130	.....	.....	30,905,440	5,175,364
1942.....	619,380	299,688	10,476,770	6,809,901	.....	.....	34,482,585	6,146,146

Year	Saskatchewan		Northwest Territories		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$
1931.....	.....	.....	.....	.....	25,874,723	9,026,754
1932.....	.....	.....	.....	.....	23,420,174	8,899,462
1933.....	.....	.....	.....	.....	23,138,103	8,712,234
1934.....	13,781	4,823	.....	.....	23,162,324	8,759,652
1935.....	75,558	7,555	.....	.....	24,910,786	9,363,141
1936.....	90,839	33,985	1,100	245	28,113,348	10,762,243
1937.....	100,380	35,130	1,500	335	32,380,991	11,674,802
1938.....	90,285	34,136	1,500	335	33,444,791	11,587,450
1939.....	96,423	36,640	1,500	335	35,185,146	12,067,307
1940.....	100,773	30,232	1,500	335	41,232,125	13,000,953
1941.....	106,168	31,850	1,500	335	43,495,353	12,665,116
1942.....	117,124	45,585	1,500	335	45,697,359	13,301,655

Table 147.—Production of Natural Gas in Canada, by Months, 1942

	New Brunswick	Ontario	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	78,394	1,476,794	15,441	3,824,436	5,395,065
February.....	69,596	1,360,428	16,053	3,421,694	4,867,771
March.....	61,534	1,247,777	11,023	3,334,127	4,654,461
April.....	59,847	1,032,425	10,595	2,723,218	3,826,085
May.....	52,204	796,150	5,015	2,349,200	3,202,569
June.....	38,143	588,178	4,807	1,827,174	2,458,302
July.....	30,120	476,156	3,456	1,808,406	(a) 2,318,638
August.....	27,315	510,820	3,644	1,846,965	(a) 2,389,744
September.....	31,205	592,285	6,020	2,370,421	(a) 3,000,431
October.....	42,906	650,643	8,535	2,861,719	3,563,803
November.....	57,631	765,957	13,757	3,805,321	4,612,666
December.....	70,485	979,157	18,778	4,309,904	5,378,324
Total.....	619,380	10,476,770	117,124	34,482,585	45,697,359

(a) Includes production from Fort Norman, Northwest Territories.

Table 148.—Natural Gas Production in Ontario, by Fields, 1941 and 1942

County	Field	1941	1942
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	32,418	32,419
Kent.....	Tilbury.....	2,433,968	2,528,029
	Declute.....	1,482,186	824,325
	Dover.....	341,516	310,261
Lambton.....	Chatham.....	165,010	1,127,281
	Dawn.....	1,661,500	1,526,149
Middlesex.....	Oil Springs.....	8,249	
Oxford.....	Mosa.....		
Elgin.....	Brownsville (x).....	220,077	77,905
Elgin.....	Bayham.....	71,692	118,257
	Malahide.....	2,497,447	868,299
Norfolk.....	Norfolk.....	421,717	431,926
Lincoln.....	(Lincoln.....		
Haldimand.....	Haldimand.....	1,962,524	2,124,122
Wentworth.....	Wentworth.....		
Welland.....	Welland.....	274,039	288,663
Brant.....	Onondaga.....	182,360	145,134
Prince Edward.....	Hallowell.....		
Wells in surface drift.....	Harwich and Howard Tps.....	14,000	14,000
Private wells.....		60,000	60,000
Total produced.....		11,828,703	10,476,770

(x) Dereham Twp..... 178,841 M cu. ft.; Bayham Twp..... 41,236 M cu. ft.—1941

x) Dereham Twp..... 58,782 M cu. ft.; Bayham Twp..... 19,123 M cu. ft.—1942

Table 149.—Number of Gas Wells in Canada, by Provinces, 1940-1942

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year.....1940	39	3,163		4	95	3,301
.....1941	42	3,240		3	95	3,350
.....1942	40	3,277		3	104	3,424
Number of productive wells drilled.....1940	4	151				155
.....1941	3	173				176
.....1942	2	148			4	154
Number of dry wells drilled.....1940	1	86		1		88
.....1941		143				143
.....1942		144				144
Number of wells abandoned.....1940	1	91		1		93
.....1941	5	127				132
.....1942		74				74
Productive wells at end of year.....1940	42	3,240		3	95	3,350
.....1941	40	3,277		3	104	3,424
.....1942	42	3,344		4	108	3,498

Table 150.—Natural Gas Wells in Ontario by Townships, 1941 and 1942

Township	1941				1942			
	No. of producing wells in operation Dec. 31, 1940	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1941	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Ancaster.....			2					
Anderson.....								
Bayham.....	65	7			59	1	1	
Bertie.....	138	8	1	11	144	2		8
Binbrook.....	49				49		3	4
Brantford.....	2				2		1	
Caistor.....	65	1	2	2	66	2	1	7
Camden Gore.....			3	1			6	
Canboro.....	153	14	1	5	148	1		2
Cayuga N.....	195	7	3	8	198	9	1	2
Cayuga S.....	54		1		55	1	2	1
Charlotteville.....	13				13		2	
Chatham.....	9	1	12	9	19	1	14	1
Colchester.....			1					
Crowland.....	28		2		27	1		
Culross.....			2				1	
Dawn.....	24	1	1		21			6
Delaware.....							1	
Delhi Village.....					3			
Dereham.....	52	34	1		8		3	
Dorchester N.....			2				2	
Dover West.....	21		1		21			
Dover East.....								
Dunn.....	50				50	1		2
Dunwich.....			2					
Enniskillen.....	1		1		1			
Gainsboro.....	13			1	15			
Glanford.....	10				10			
Gosfield S.....	21			1	25			1
Hallowell.....	13							
Harwich.....							1	
Houghton.....	4				4		1	
Humberstone.....	68	2	4	13	77	3		7
Kincardine.....			1					
Malahide.....	46		5	17	63	5	19	6
Malden.....	1	1	7					
Mersea.....	3				3		1	
Middleton.....	51	3	7	1	48	1	1	
Mosa.....	3	1						
Moulton.....	110	9		1	102	9		4
Norwich S.....			3				2	1
Oneida.....	69	3	8	15	82	4	8	10
Onondaga.....	37	6			31	1	1	
Orford.....			3				2	
Oxford N.....			1					
Oxford W.....			6					
Port Dover Village.....					3			
Port Rowan.....					4			
Rainham.....	326	5	3	3	323	4	1	6
Raleigh.....	56	2	1	2	53		3	
Romney.....	130			4	133	2		6
Sarnia.....					13			
Seneca.....	152	3	1	9	161	4	2	1
Sherbrooke.....	15				12	1	2	4
Southwold.....							1	
Tilbury East.....	126		1	2	127	7	1	
Townsend.....	3				4	1	3	8
Tuscarora.....	72	3	4	7	76	3	3	1
Wainfleet.....	28	4	2	2	26	1	6	6
Walpole.....	432	10	27	41	459	9	34	48
Walsingham N.....	8		1		8			
Walsingham S.....	19				15			
Westminster.....							1	
Willoughby.....	53	1	3	1	53		1	
Windham.....	10		12	11	18		5	3
Woodhouse.....	73	1	4	5	76		4	3
Yarmouth.....			2				2	
Private Wells.....	300				300			
Surface wells.....	69				69			
Total.....	3,240	127	143	173	3,277	74	144	148

Table 151.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1941 and 1942

	1941			1942		
	Ontario	Alberta	Canada*	Ontario	Alberta	Canada*
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of land, buildings, plant, machinery and tools.....	43,727,294	25,433,809	70,587,671	43,953,488	25,644,329	71,032,694
Cost of supplies and stock on hand.....	875,341	282,838	1,181,581	839,411	342,640	1,202,091
Cash, trading and operating accounts and bills receivable.....	6,926,006	2,449,494	9,511,289	7,447,188	2,926,010	10,533,817
Total.....	51,528,641	28,166,141	81,280,541	52,240,087	28,912,979	82,768,602

*Includes data for New Brunswick and Saskatchewan.

Table 152.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1941 and 1942

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1941					\$	\$	\$
New Brunswick.....	13	8	91	112	39,603	109,374	148,977
Ontario.....	591	152	786	1,529	1,065,265	864,760	1,930,025
Saskatchewan.....	1	1	7	9	3,000	2,465	5,465
Alberta.....	247	46	218	511	551,691	205,637	757,328
Canada.....	852	207	1,102	2,161	1,659,559	1,182,236	2,841,795
1942							
New Brunswick.....	11	11	71	93	40,610	104,901	145,511
Ontario.....	548	155	626	1,329	1,078,481	727,295	1,805,776
Saskatchewan.....	3	1	.....	4	4,500	.....	4,500
Alberta.....	243	60	211	514	573,068	297,956	871,024
Canada.....	805	227	908	1,940	1,696,659	1,130,152	2,826,811

* See footnote on page 96, table 20.

Table 153.—Number of Wage-Earners in the Natural Gas Industry in Canada, by Months, 1942

Month	1942	
	Male	Female
January.....	872	4
February.....	841	8
March.....	831	5
April.....	860	3
May.....	952	9
June.....	1,013	8
July.....	993	11
August.....	972	10
September.....	909	8
October.....	880	7
November.....	823	6
December.....	763	7
Average.....	901	7

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum; and (2) Petroleum Products

(1) Production of Crude Petroleum

Production of crude petroleum and natural gasoline in Canada during 1942 totalled 10,364,796 barrels valued at \$15,968,851 compared with 10,133,838 barrels worth \$14,415,096 in 1941. Comprising the 1942 output were 10,117,073 barrels from Alberta, 143,845 barrels from Ontario, 75,789 barrels from Northwest Territories and 28,089 barrels from New Brunswick. The following is from a review on petroleum in 1942 as prepared by the Bureau of Mines, Ottawa:

"About 97 per cent of the oil produced in Canada in 1942 came from the Turner Valley field of Alberta, where the Madison Limestone is the chief source formation, a very small amount being obtained from sands in the overlying Cretaceous rocks. The oil from the Madison Limestone is obtained from oil and gas wells, and to this is added the natural gasoline recovered in absorption plants from the gas from these wells.

"Until June 1936, except for a few wells yielding a heavier product from near the lower margin of the gas-cap, production from Turner Valley was almost entirely obtained from gas wells in the form of "naphtha", an unstabilized natural gasoline. Since then, development has been almost entirely toward production from the liquid-phase zone of the limestone lying on the western flank of the gas-cap. The oil ranges in gravity from 38° just above the still deeper-lying water zone to 45° adjacent to the gas-cap.

"Interest in Turner Valley during 1942 was centred chiefly in the north end of the field where an ambitious program of drilling was started towards the end of 1941 to prove its extension northwards as far as the Sarcee Indian Reserve. Twenty-nine wells were brought into steady production in Turner Valley. The distribution of developments along the 20 miles of the field, now proved to be oil-bearing, was somewhat as follows: In Range 2 west of the 5th Meridian, in township 18, one well came into production, one was still drilling and drilling of one was resumed; in township 19, eight wells were brought into production; in Range 3 west of the 5th Meridian, in township 19, three wells entered production and one was still drilling; in township 20, three wells were brought into production, eight were still drilling, and one was abandoned owing to water; in township 21 fourteen wells were brought into production, nine were still drilling, three were suspended and two were abandoned owing to depth; in Range 4 west of the 5th Meridian, in township 21 one well was drilling and two were abandoned; in township 22, one was suspended and seven were abandoned; in township 23, one was suspended and one abandoned. A total of 352,339 feet of drilling was done.

"Thus, much of the drilling to extend the field northwards proved ineffective, the structure being more complex than was expected; and the limestone is deep-seated north of Whiskey Creek along the zone explored. Some narrowing of the productive gap in the centre of the field was achieved by wells in townships 19 and 20 near Sheep River, although in general this part is less productive. In a sense the gap is bridged by the former highly productive pool in the gas cap associated with Royalite 4.

"It is a remarkable fact that of the 214 wells completed since the crude oil development began in 1936, and ignoring those unsuccessfully drilled in the attempt to extend the field northward, only 13 were completed as gas wells or had to be abandoned, and one was abandoned after productive life because of inability to cope with water. Water drive must be too slow in Turner Valley to play an important role in oil production; the recession of the upper limit of the liquid-phase zone consequent on production is noticeable, however, and occasionally as the gas/oil ratio of marginal wells rises above 30,000 such wells pass into the category of gas wells. Eight more wells were ready for reclassification at the end of the year, all in the older, southern area. With the experience gained in that area in conservation, the northern end should be saved from premature decline in oil production, due to condensation in the formation. Thus 192 of the 214 wells are still in production, to which should be added the two Model wells drilled earlier.

"An important investigation was started in December, 1942, in an effort to inject gas into the more depleted part of the Turner Valley field. This took the form of returning gas from the Frontier and Sundance Wells, later to be supplemented by that from the Prairie Well, to Foundation Well. Successful repressuring of the limestone would greatly augment the ultimate recovery of oil per acre.

"During the year, the method of conservation in Turner Valley was changed for one devised by Prof. G. G. Brown of Michigan University under which the allowables of the wells are based on reservoir displacement at the rate of 25 barrels of reservoir fluid per acre per day. With this and earlier efforts, the over-all gas/oil ratio of Turner Valley has steadily declined since July 1941.

"In November, a deep test was started to explore the possibility of the Devonian limestone carrying oil in commercial quantity. It is located in the central part of the field in legal subdivision 2-25-19-3-5, and had reached a depth of 3,576 feet by the end of the year. It is being financed by 14 companies operating in the field. The Devonian limestone is believed to lie about 2,000 feet below the Madison in the more westerly part of the field, having been cut off by the 'sole fault' farther east. Should the Devonian limestone prove productive it will prolong the life of the Turner Valley field considerably.

"Other parts of the Albertan Foothills received much drilling attention. A test outside Jasper Park at Solomon Creek had reached 4,774 feet at the close of the year; another at Jumping Pound, west of Calgary, was at 5,131 feet. Later in the year a well was located on a large structure west of Nanton in Sullivan Creek. Ram River Well No. 2 was completed at 4,340 feet, but had not been tested. The test on Forget-me-not Ridge, legal sub-division 8-17-22-6-5, reached 2,800 feet, and that in the Willow Creek area, legal sub-division 2-17-13-3-5, was at 840 feet.

"Drilling was particularly active in the Plains of Alberta at Vermilion, where fifteen wells were completed and three abandoned. Better facilities were being planned for the dehydration of the oil, which forms an excellent fuel oil for the locomotives of the C.N.R., and the drilling of more wells was planned. Owing to difficulties in the disposal of the oil in the meantime it was not possible to test the production fully, but during the year 63,793 barrels were produced from 18 wells.

"In the southern part of Alberta, a well drilled at Taber into the Madison Limestone and plugged to the overlying Sunburst Sand proved to be the largest producer in Alberta outside Turner Valley, its initial production being 330 barrels per day (18.3° API). In the last quarter of the year it produced 18,854 barrels.

"An 80-barrel well (24° API) was completed at Tilley, southeast of Brooks early in April and produced 5,718 barrels. Other tests in the vicinity proved failures. In general the area in southeastern Alberta stretching from the Bow River northwards to Monitor, which was the scene of much drilling following geophysical and geological surveys, did not meet expectations. Structures were tested near Grantham, Monogram, Rolling Hills, Jenner, Oyen, and more to the west at Eyremore and Castor.

"A new producer was drilled at Wainwright and a test was begun at Del Bonita.

"In the Pouce Coupé district, a hole spudded in May had reached a depth of 2,129 feet. The test at Commotion Creek on the British Columbia side was abandoned at 6,940 feet.

"In Saskatchewan, geophysical and geological exploration continued and deep tests followed. One, 6 miles west of Radville reached 7,958 feet, but was abandoned because of mechanical trouble. Another in southeastern Saskatchewan reached 3,344 feet and one at legal sub-division 2-30-26-2 was abandoned at 1,699 feet owing to drilling difficulties. The hole at legal sub-division 6-21-11-29-3, which had been standing for several years, was deepened from 2,690 to 3,253 feet in an attempt to reach the limestone, and one started near Muddy Lake had reached 400 feet.

"In Ontario, crude oil continues to be produced at Petrolia, Oil Springs, Bothwell, and in the townships of Dawn, Warwick, West Dover, and Mosa in the southwestern part of the Province.

"In Quebec, the deep test in the eastern part of Gaspé peninsula was abandoned at 4,770 feet.

"In New Brunswick, geophysical work was done across the Stoney Creek field and extended to Albert Mines. One new well was drilled, having an initial production of 60 barrels a day; two old wells were shot.

"In the Northwest Territories an important development in 1942 was the exploratory drilling (the Canol Project) undertaken at Norman Wells to meet the expanding requirements of the region.

"The Canol project came about through military necessity. The object was threefold, namely, to drill wells for oil in the Fort Norman and adjoining areas, to transport the oil by pipeline 600 miles from Norman Wells to Whitehorse, and to build a refinery at Whitehorse to make petroleum products. Imperial Oil Company, Limited, was concerned only with the first of these objectives, namely oil production, and, accordingly, an arrangement was entered into between the United States Government and the Imperial Oil Company for the drilling of the wells, and between Imperial Oil Company and the Dominion Government for the securing of mineral rights and other necessary concessions. The pipeline and the Whitehorse refinery is a United States army project.

"Work on the Canol project was started in the early summer of 1942, and in that year sixteen wells were drilled, of which two were dry. Up to November 1, 1943, fourteen more wells were drilled, bringing the total to thirty. Of these, twenty-three found oil in commercial quantity and seven either were dry or obtained only a very small yield. These are in addition to the four producing wells of the Imperial Oil Company drilled prior to 1942".

"Large deposits of oil shale are known to exist in different parts of Canada, the best known occurrences being in Pictou and Antigonish counties, Nova Scotia, and Albert and Westmorland counties, New Brunswick. As shale oil cannot compete with petroleum at present prices, none of these deposits has as yet been actively developed on a commercial scale.

"As a war project, the Mines and Geology Branch, Department of Mines and Resources, Ottawa, on the request of the Oil Controller, drilled some of the oil shale occurrences in New Brunswick with a view to the evaluation of them as a source of oil and lubricants under war conditions. In one of the projects, forty-three holes were drilled in oil shale deposits in the Rosevale area and in the vicinity of Taylor Village, New Brunswick, but the results were disappointing. Thirty-six holes were also drilled in deposits at Albert Mines, New Brunswick, and the results indicate that upwards of 20,000,000 tons of low-grade material is available, the average grade being estimated at 12 to 14 gallons a ton.

"There has been no production reported for a number of years.

"Experimental plants were erected in 1929-30 near Rosevale, New Brunswick, and New Glasgow, Nova Scotia, to treat local shales but they operated only for short periods. Activity has been confined chiefly to field exploration and to laboratory investigation. Laboratory work by the Bureau of Mines of the Department of Mines and Resources at Ottawa has included the determination of the petroleum content of representative samples from various localities; the determination of important factors affecting the recovery of crude petroleum by destructive distillation and of the character of the petroleum recovered; and the investigation of the processes designed for the distillation of oil shale. No oil shale is being imported into Canada.

"For many years the large-scale production of oil shale was confined to Scotland, but deposits in Manchuria and Esthonia were being developed in 1938 on a large scale. The production of these countries in 1938 (1939-42 not available) was: Scotland, 1,551,346 tons; Esthonia, 1,450,885 tons; and Manchuria, approximately 3,000,000 tons. Austria, France, Germany, Italy, Spain, Russia, and South Africa also produce small quantities of oil shale. No recent figures are available for production in Esthonia, Manchuria, France or other European countries and statistics of the Scottish Shale Industry are not being published for the war period.

"A deposit of bituminous sand occurs along Athabaska River between the twenty-third and twenty-sixth base lines. Intermittent exposures may be seen along both sides of the river and also along certain of its tributaries. Investigations by the Federal Bureau of Mines subsequent to 1913 have adduced much information and certain parts of the area appear to be promising from the standpoint of commercial development. It is clear, however, that only after detailed exploration by the use of core drilling equipment, can the true value of individual areas be determined. Meanwhile it is assumed that the area as a whole, represents an important reserve of bituminous material from which various light and heavy petroleum products may be derived.

"In connection with investigations by the Federal Bureau of Mines, some 5,000 tons of bituminous sand was mined and shipped during the period 1926-1930. A part of this material was used as a basis for laboratory studies but the greater part was successfully used in the construction of a variety of types of wearing surfaces.

"During the period 1931-1938, International Bitumen Company processed a limited tonnage of bituminous sand at its plant at Bitumont, Alberta, with production of asphalts for paving and roofing and also 37,000 gallons of fuel oil. This plant has been dormant since 1938.

"In 1941, Abasand Oils, Limited completed its revised separation and refining plant on Horse River near McMurray. The plant was operated from May 19 to November 21 when separation and power units were destroyed by fire. During the above period, production included 41,265 gallons of gasoline, 70,700 gallons of Diesel oil, 137,550 gallons of fuel oil, 375,235 gallons of residuum, and 319 tons of coke. Following reconstruction in 1942, the Abasand plant was operated intermittently from June 10 to November 6. During this period approximately 12,800 tons of sand were mined and approximately 385,000 gallons of crude produced. Refined products made during this period were 12,600 gallons of gasoline, 79,555 gallons of Diesel oil, 27,300 gallons of fuel oil, and 266,139 gallons of residuum. Operations indicated the desirability of further revisions of equipment and flow sheets and plans are now being prepared to carry these revisions into effect.

DOMINION BUREAU OF STATISTICS

"In July, 1942, under an agreement with the Dominion Government, Consolidated Mining and Smelting Company undertook to core drill certain of the more promising areas in the McMur-ray field and drilling was continued until the end of January, 1943. Arrangements have also been made with the Universal Oil Products Corporation and with the Standard Oil Development Company with a view to determining refining procedure and equipment best adapted to the final treatment of separated bitumen and also the type of products and percentages of same which may be most economically produced."

Table 154.—Production of Crude Petroleum in Canada, by Provinces, 1933-1942

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1933.....	8,835	18,111	136,058	253,486	995,832	2,844,157	4,608	23,037	1,145,333	3,138,791
1934.....	11,106	22,277	141,385	299,874	1,253,966	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,767
1937.....	18,089	25,496	165,205	356,000	2,749,085	4,961,002	11,371	56,855	2,944,750	5,399,353
1938.....	19,276	27,246	172,641	359,268	6,751,312	8,775,094	22,855	68,565	6,966,084	9,230,173
1939.....	22,799	32,082	206,379	401,430	7,576,932	9,362,363	20,191	50,477	7,826,302	9,846,352
1940.....	22,167	31,220	187,644	397,078	8,362,202	10,694,394	18,633	37,265	8,590,972	11,160,213
1941.....	31,359	44,102	160,238	337,760	9,918,572	13,985,965	23,664	47,328	10,133,834	14,415,096
1942.....	28,089	39,467	143,845	306,242	10,117,072	15,514,666	75,789	108,477	10,364,792	15,968,851

*Includes 331 barrels at \$256 in Saskatchewan.

Table 155.—Production of Crude Petroleum in Canada, by Months, 1942
(Barrel=35 imperial gallons)

Month	*New Brunswick	Ontario	*Alberta	*Northwest Territories	Canada
	Barrels	Barrels	Barrels	Barrels	Barrels
January.....	1,827	11,528	862,472	.....	875,827
February.....	1,593	10,729	833,607	260	846,189
March.....	1,961	12,550	908,666	.....	923,177
April.....	1,691	12,584	832,458	4	846,737
May.....	2,507	12,777	876,893	30	892,207
June.....	2,980	13,063	821,623	19,246	856,912
July.....	2,646	13,428	837,079	16,048	869,201
August.....	3,022	11,405	837,513	18,335	870,275
September.....	2,774	11,576	803,097	9,578	827,025
October.....	2,679	11,345	842,204	3,832	860,060
November.....	2,002	11,508	822,397	2,604	838,511
December.....	2,407	11,352	839,064	5,852	858,675
Total.....	23,089	143,845	10,117,073	75,789	10,364,796

* These figures include total output each month.

Table 156.—Petroleum Wells in Canada, by Provinces, 1940-1942

	New Brunswick	Ontario	Alberta	Northwest Territories	Canada
Productive wells at beginning of year.....1940	22	2,065	219	2	2,308
.....1941	20	2,023	235	3	2,286
.....1942	20	1,956	274	3	2,253
Number of productive wells drilled.....1940	42	35	35	1	78
.....1941	35	48	48	.....	83
.....1942	1	13	45	17	76
Number of wells abandoned.....1940	2	61	2	.....	65
.....1941	.....	31	9	.....	40
.....1942	.....	54	14	.....	68
Number of dry wells drilled.....1940	.....	36	7	.....	43
.....1941	.....	39	10	.....	49
.....1942	.....	13	21	.....	34
Number of productive wells in operation at end of year.....1940	26	2,028	235	3	2,286
.....1941	24	1,956	274	3	2,253
.....1942	21	1,852	305	20	2,198

Table 157.—Production of Crude Petroleum in Canada, 1941 and 1942

	1941		1942	
	Barrels	Total value	Barrels	Total value
NEW BRUNSWICK	31,359	\$ 44,102	28,089	\$ 39,467
ONTARIO—				
Petrolia and Enniskillen.....	55,383	115,473	51,917	109,315
Oil Springs.....	29,783	65,761	27,279	60,804
Moore Township.....	1,333	2,779	728	1,533
Sarnia Township.....	213	444	315	663
Plympton Township.....	93	194	24	50
Bothwell Township and Thamesville.....	33,053	68,916	27,946	58,842
West Dover, Raleigh, and Tilbury East.....	9,819	20,473	8,494	17,885
Onondaga.....	300	625	58	122
Mosa Township.....	19,075	39,771	19,209	40,446
Brooke.....	113	236	77	162
Dunwich.....	420	876	358	754
Romney.....			81	171
Dawn and Euphemia.....	834	1,739	597	1,257
Warwick.....	9,748	20,325	6,524	13,737
Chatham.....	27	56		
Manitoulin Island.....	44	92		
Collingwood.....			35	74
Private sales.....			203	427
Total for Ontario	160,238	337,760	143,845	306,242
SASKATCHEWAN				
ALBERTA—				
Turner Valley.....	9,870,550	13,947,320	10,080,305	15,482,846
Red Coulee (light crude).....	11,065	10,902	9,546	9,400
Wainwright-Rubstone (heavy crude).....	36,962	27,684	27,222	22,419
Taber-Moose Dome.....				
Total for Alberta	9,918,577	13,985,906	10,117,073	15,514,665
NORTHWEST TERRITORIES	23,664	47,328	75,789	108,477
Canada	10,133,838	14,415,096	10,364,796	15,968,851

Table 158.—Capital Employed in the Petroleum Industry in Canada, by Provinces, 1941 and 1942

	1941			1942		
	Ontario	Alberta	Canada*	Ontario	Alberta	Canada*
Capital employed as represented by:	\$	\$	\$	\$	\$	\$
Cost of land, buildings, plant, machinery and tools.....	957,757	45,439,003	46,676,002	1,057,720	41,932,130	43,583,146
Cost of supplies and stock on hand.....	19,424	2,200,221	2,277,566	15,987	2,539,811	2,878,305
Cash, trading and operating accounts and bills receivable.....	36,828	9,079,038	9,253,416	28,121	7,571,882	8,245,831
Total	1,014,009	56,718,262	58,206,984	1,101,828	52,043,824	54,707,282

Data for New Brunswick included with the Natural Gas Industry.

* Includes data for the Northwest Territories.

Table 159.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,* 1941 and 1942

Province	Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1941					\$	\$	\$
Ontario.....	20	2	157	179	21,587	107,916	129,503
Alberta.....	335	58	1,264	1,657	842,047	2,264,417	3,106,464
Canada†	356	60	1,428	1,844	867,638	2,387,179	3,254,817
1942							
Ontario.....	18	3	189	210	21,071	118,840	139,911
Alberta.....	337	106	1,197	1,640	910,688	2,279,270	3,189,958
Canada†	371	113	1,488	1,972	997,609	2,651,356	3,648,965

* Data for New Brunswick is included in the Natural Gas Industry.

† Data for Northwest Territories included with Canada.

Table 160.—Number of Wage-Earners in the Petroleum Industry in Canada, by Months, 1942

Month	1942	
	Male	Female
February.....	1,352	4
February.....	1,286	4
March.....	1,398	4
April.....	1,441	3
May.....	1,450	4
June.....	1,441	5
July.....	1,543	5
August.....	1,566	5
September.....	1,509	4
October.....	1,530	3
November.....	1,514	3
December.....	1,521	3
Average.....	1,483	5

PETROLEUM PRODUCTS INDUSTRY

Statistics for the Petroleum Products Industry cover all establishments in Canada which were occupied chiefly in (a) the refining of crude oil to produce gasoline, fuel oil, etc., and (b) the blending or compounding of lubricating oils and greases.

Thirty-five refineries and 18 blending plants, or a total of 53 works, reported under this category in 1942 and the aggregate value of production was \$163,716,515, an increase of 4.5 per cent over the 1941 total of \$156,635,495.

Output figures for 1942 included \$162,628,828 for petroleum refineries and \$1,087,687 for concerns engaged in blending oils and greases, against corresponding totals in 1941 of \$155,389,872 and \$1,245,623, respectively. The principal statistics for each of these groups and for the industry as a whole are tabulated below and the detailed figures for each division are recorded separately in the succeeding pages of this report.

Thirty-five petroleum refineries operating in Canada during 1942 were distributed by provinces as follows: 8 in Saskatchewan, 8 in Alberta, 5 in Ontario, 4 in Quebec, 4 in Manitoba, 3 in British Columbia and 1 in each of Nova Scotia, New Brunswick and Northwest Territories. Compared with 1941, there was an increase of 1 refinery in Alberta and a loss of 1 in Saskatchewan. The operating refineries had a capacity of 233,115 barrels of crude oil per day, of which Ontario had 68,000 barrels or 29 per cent; Quebec, 67,000 barrels or 28 per cent; Nova Scotia, 34,000 barrels or 14 per cent; British Columbia, 24,500 barrels or 11 per cent; Saskatchewan, 16,775 barrels or 7 per cent; Alberta, 18,100 barrels or 8 per cent; Manitoba, 3,650 barrels or 2 per cent; the Northwest Territories, 840 barrels or .4 per cent, and New Brunswick, 250 barrels.

During the year, 1,551,617,151 gallons of imported crude oil and 359,535,738 gallons of crude oil and absorption gasoline from Canadian wells, or a total of 1,911,152,889 gallons was put through Canadian refineries, this amounting to about 64 per cent of the rated capacity. Of the total crude input, about 60 per cent was imported from the United States and nearly 21 per cent from other countries, while about 19 per cent came from Canadian wells. The total cost at the refineries of all crude oil and naphtha charged to stills during the year was \$112,453,974. Stocks of crude oil held at the refineries on December 31 amounted to 125,370,278 gallons.

Refinery production of gasoline in 1942 amounted to 749,364,750 gallons, and in addition the refineries used for blending about 25,160,862 gallons of imported casinghead gasoline which is not included in the Canadian production figures. The gallonage of gasoline made in 1942 was 12 per cent under 1941, which, in turn, was 10 per cent over 1940. The refinery selling value of the gasoline made during the year was \$91,958,033. Stocks of gasoline held by the refineries on December 31 included 83,699,915 gallons of straight run or cracked gasoline and 785,832 gallons of imported casinghead gasoline. In 1942 there was an output of 10,392,819 gallons of natural gasoline from absorption plants in Alberta. This was practically all sold to refineries and is included with the gallonage charged to stills, and the refined gasoline made therefrom is included in the refinery output figures.

Imports of gasoline, including casinghead, amounted to 115,995,765 gallons during 1942, which, added to the production of 749,364,750 gallons plus the decline in producers' and consumers' stocks of 40,175,792 gallons and less the exports of 15,897,471 gallons, made an apparent Canadian consumption of 889,638,836 gallons. Actual sales reported to the Provincial Governments under the Gasoline Tax Acts amounted to 897,806,958 gallons.

Production of fuel and gas oils (excluding any made and used for cracking processes) totalled 559,801,397 gallons, of which 793,726,433 gallons were made for sale and 66,074,964 gallons for use as fuel in the producing plant. Imports amounted to 40,480,340 gallons and exports to 50,964,402 gallons. Stocks of fuel oil and distillate at the end of the year stood at 231,800,458 gallons, or about 5,143,240 gallons more than in 1941. Output of tractor and engine distillate was 44,676,079 gallons in 1942, imports amounted to 1,285,939 gallons, and producers' stocks increased 1,845,890 gallons. The apparent consumption of fuel oils and distillate in Canada, as calculated from the above figures, amounted to 890,136,113 gallons.

Capital employed in the petroleum refining industry in 1942 was reported at \$83,556,904, of which \$39,174,376 was the value placed on land, buildings, machinery and equipment, \$40,075,515 represented inventories of finished products and processing materials, and \$4,307,013 were for operating capital, such as cash, bills and accounts receivable. The monthly employment averaged 5,835 persons who received \$11,361,200 in salaries and wages. Expenditures for fuel and electricity amounted to \$7,072,252, and \$121,177,036 were paid out for crude oil and other processing materials.

For more complete information see the Dominion Bureau of Statistics report "The Petroleum Products Industry in Canada 1942".

Table 161.—Materials Used in Petroleum Refineries, 1941 and 1942

Material	Unit of measure	1941		1942	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Crude oil (under 60° A.P.I.) in its natural state, from Canadian wells.....	Imp. gal.	342,774,192	17,627,799	349,255,157	19,047,524
Absorption gasoline, etc., from Canadian wells (run to stills).....	Imp. gal.	10,065,382	643,968	10,280,581	726,600
Crude oil, in its natural state, imported, (run to stills)—					
(a) From United States.....	Imp. gal.	948,975,940	55,377,605	1,146,769,895	69,828,576
(b) From Other Countries.....	Imp. gal.	731,145,673	39,877,817	396,913,456	21,572,639
Crude oil, not in its natural state (run to stills).....	Imp. gal.	936,880	47,765	7,933,800	1,278,635
Benzol for blending.....	Imp. gal.	4,753,868	568,575	3,954,267	531,217
Phenol.....	pound	470,309	69,308	631,331	93,547
Sulphuric acid, 66° Bé.....	pound	29,316,857	315,083	34,741,455	396,297
Sulphur.....	pound	102,634	2,649	63,375	1,561
Caustic soda.....	pound	7,170,755	205,336	5,786,123	171,668
Soda ash.....	pound	410,738	8,920	327,366	7,350
Litharge.....	pound	257,296	22,430	195,309	17,245
Fullers' earth and clay.....	pound	30,155,750	571,010	24,162,091	528,350
Compounding materials.....			1,386,825		227,931
Tetraethyl fluid.....	c.c.		3,944,940	1,538,594,864	3,523,276
Aviation blending materials.....			1,458,307		1,758,052
Other materials.....			2,013,991		677,034
Shipping containers.....			1,115,986		789,534
Total.....			125,258,314		121,177,036

Table 162.—Products Made in Petroleum Refineries, 1941 and 1942

Product	Unit of measure	1941		1942	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
MADE FOR SALE—					
Gasoline—Straight run (1).....	Imp. gal.	407,405,924	44,722,348	379,188,943	50,036,253
By cracking process (2).....	Imp. gal.	450,312,427	45,535,487	369,985,302	41,897,722
Stove oil (40°–42° 5' A.P.I.).....	Imp. gal.	23,231,604	1,307,618	24,515,578	1,652,595
Gas and light fuel oil (20°–40° A.P.I., except diesel).....	Imp. gal.	135,322,293	7,512,639	141,126,499	8,016,052
Diesel fuel oil (all fuel oil sold under this name).....	Imp. gal.	79,104,809	4,192,138	79,247,928	4,644,937
Residual fuel oil (10°–20° A.P.I.).....	Imp. gal.	534,238,465	23,197,496	548,836,428	24,978,037
Tractor and engine distillate.....	Imp. gal.	40,807,811	3,748,290	44,636,725	4,534,787
V.M. and P. or solvent naphtha.....	Imp. gal.	12,092,093	1,230,697	20,907,259	2,355,333
Kerosene.....	Imp. gal.	26,758,097	2,741,984	24,912,066	2,766,291
Lubricating oil.....	Imp. gal.	36,433,253	7,089,121	38,076,120	7,405,169
Lubricating grease.....	pound	15,562,856	861,604	20,874,531	1,171,490
Asphalt.....	Imp. gal.	72,752,742	6,168,440	55,008,547	4,709,563
Petroleum coke.....	ton	67,702	471,564	64,461	464,326
Other products.....			479,572		1,232,878
Total—Made for Sale.....			149,258,993		156,465,433

Table 162.—Products Made in Petroleum Refineries, 1941 and 1942—Concluded

Product	Unit of measure	1941		1942	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
MADE FOR OWN USE—					
Gasoline—Straight run.....	Imp. gal.	192,848	21,650	182,635	22,937
By cracking process.....	Imp. gal.	13,255	1,684	7,870	1,121
Stove oil.....	Imp. gal.			890	39
Gas and light fuel oil (20°-40° A.P.I.).....	Imp. gal.	100,396	4,545	69,101	4,232
Diesel fuel oil.....	Imp. gal.	18,831	1,230	72,646	4,302
Residual fuel oil (10°-20° A.P.I.).....	Imp. gal.	62,832,512	2,727,422	65,932,327	3,068,787
Tractor and engine distillate.....	Imp. gal.	2,315	170	39,354	3,254
Kerosene.....	Imp. gal.	41,741	3,775	45,730	4,814
Lubricating oil.....	Imp. gal.	93,918	17,453	61,516	12,755
Asphalt.....	Imp. gal.	62,003	5,485	57,236	5,324
Petroleum coke.....	ton	3,138	21,774	8,950	63,411
Still gas.....	M cu. ft.	9,971,268	3,109,920	7,621,105	2,734,711
Other products.....			215,766		237,708
Total—Made for Own Use.....			6,130,874		6,163,395
Grand Total.....			155,389,872		162,628,828
Fuel and gas oils and topped crude, for use in cracking process.....	Imp. gal.	765,115,376		522,046,536	

(1) Includes recoveries from Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casinghead gasoline which was used for blending at the refineries.

(2) Includes polymer gasoline;

CHAPTER EIGHT

THE NON-METALLIC MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Asbestos	Miscellaneous	Magnesitic dolomite
Feldspar, Nepheline	Barite	Magnesium sulphate
Syenite and Quartz	Diatomite	Mineral waters (natural)
Gypsum	Fluorspar	Phosphate
Iron oxides (ochre)	Garnet	Pyrites (sulphur)
Mica	Graphite	Silica brick
Peat fuel	Grindstones, etc.	Sodium carbonate
Peat moss	Lithium minerals	Sodium sulphate
Salt		Strontium minerals
Talc and soapstone		

THE ASBESTOS MINING INDUSTRY, AND THE ASBESTOS PRODUCTS INDUSTRY

Production (mine sales) of asbestos in Canada during 1942 totalled 439,459 short tons valued at \$22,663,283 compared with 477,846 short tons worth \$21,468,840 in 1941. The mineral as mined in both years was of the chrysotile or serpentine variety and came entirely from properties operated in the province of Quebec. Reserves of milling grade asbestos rock have been reported as sufficient for many years of commercial fibre production. Production of asbestos in Canada from 1880 to 1942, inclusive, totalled 8,194,478 short tons valued at \$314,769,497.

The number of Canadian asbestos companies reported as active in 1942 totalled 8; capital employed in the industry amounted to \$18,741,364; employees numbered 3,749, and salaries and wages distributed aggregated \$5,299,454. A relatively small quantity of asbestos fibre was recovered in 1942 as a by-product in the mining of magnesitic dolomite, at Kilmar, Quebec.

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Asbestos of commerce consists mostly of the three varieties known as chrysotile, amosite, and crocidolite or blue asbestos, with chrysotile being by far the most important and widely used. Three other varieties that have only a limited field of usefulness are fibrous actinolite, fibrous tremolite, and anthophyllite.

"The asbestos produced in Canada is practically all of the chrysotile variety and comes almost entirely from areas of serpentinized rock in the Eastern Townships, Quebec, where the producing centres are Thetford Mines, Black Lake, East Broughton, Vimy Ridge, Asbestos, and St. Remi de Tingwick. The Canadian deposits are the largest known in the world. Production has been continuous from the Thetford area since 1878 and reserves of asbestos-bearing rock are enormous. Core-drilling to depths greater than 1,700 feet has revealed the presence of fibre comparable in quantity and quality with that in the present workings. Most of the output consists of vein fibre obtained from veins $\frac{1}{4}$ to $\frac{1}{2}$ inch in width, though veins exceeding 5 inches in width do occur. The fibres run crosswise of the vein and thus the width of the vein determines the length of fibre. Slip fibre, occurring in fault planes, is obtained largely in the East Broughton area.

"In 1942 there were six producing companies. Asbestos Corporation, Limited, worked two properties at Thetford Mines and one each at Black Lake and Vimy Ridge. Johnson's Company operated at Thetford Mines and at Black Lake. Bell Asbestos Mines, Limited, operated at Thetford Mines; Quebec Asbestos Corporation, Limited, at East Broughton; Canadian Johns-Manville Company, Limited, at Asbestos; and Nicolet Asbestos Mines, Limited, at St. Remi de Tingwick.

"The asbestos-bearing rock is mined in open pits and underground. The method of block-caving instituted at the King mine of Asbestos Corporation in 1934 has resulted in a remarkable reduction in cost of mining and improvement in grade of mill feed. This development, coming at a time when many of the open pits had been worked almost to the economic depth and operators were faced with rising costs and with the prospect of being unable to recover much valuable rock in the walls of the pits, is of the utmost importance to the industry.

"Small deposits of chrysotile asbestos are known in other parts of Quebec and also in Ontario and British Columbia. Several have been worked from time to time. In 1942 trial shipments of chrysotile were made by Canadian Refractories Limited, from its property at Kilmar, Quebec. This asbestos has a very low content of iron and is entirely free from magnetite, and should be suitable for use in making insulation for electrical machinery.

"No amosite or crocidolite has yet been found in Canada, but there are numerous deposits of fibrous tremolite, fibrous actinolite and anthophyllite, which varieties are commercially termed amphibole asbestos. The fibres of these varieties are harsher and weaker than those of chrysotile and there is little demand for them at present. None of these deposits is being worked, although formerly fibrous actinolite was quarried near the village of Actinolite, Hastings county, Ontario, for use in making of roofing materials. Asbestos deposits reported as having been found in recent years in Manitoba and in northern and western Ontario are of the amphibole varieties. The amphibole fibres are too harsh and brittle to be spun, but they have a higher resistance to acids than has chrysotile and it is possible that material from some of the deposits may be suitable for use in acid filters and for other purposes where long harsh fibres are required.

"Few figures on world production in 1942 are available, but it is known that Canada maintained its position as the principal asbestos-producing country. Other countries producing relatively large quantities of asbestos are Russia, Rhodesia, Union of South Africa, Swaziland, the United States, and Cyprus. Small shipments of asbestos are made from Australia (crocidolite), Bolivia (crocidolite), China (chrysotile), India (chrysotile), and Venezuela (chrysotile). The world's largest market for asbestos is in the United States, and Canada's proximity to this market confers very real advantages on the asbestos industry in this country. Another development favouring the Canadian industry is the increasing demand for short grades of fibre for use in newly developed asbestos-cement products, and in moulded plastic articles.

"Most of the Canadian production of asbestos is exported in the unmanufactured state, i.e. either in the crude condition (long-fibred material only), in a partly opened state, or completely fluffed out and ready for manufacture. The great bulk of exports goes to the United States, but substantial quantities are also exported to the United Kingdom and Australia. Since September 20, 1939, the Dominion Government has controlled the export of asbestos. Late in 1942 some minor modifications were made in the classification of standard grades of Canadian asbestos and this revised classification has been adopted by the Quebec Asbestos Producers' Association.

"Asbestos is used for a great variety of purposes, the principal asbestos products being, brake linings, clutch facings, packings, cloth, insulation, mill-board, siding, shingles, roofing, tile, and pipes.

"Current prices f.o.b. Quebec mines, in U.S. funds, tax and bags included are as follows: No. 1 crude, \$650 to \$750 per ton; No. 2 crude, \$165 to \$385; spinning fibre, \$124 to \$233; shingle fibre, \$62.50 to \$85; paper fibre, \$44 to \$49; cement stock, \$28.50 to \$33; floats, \$19.50 to \$21; shorts, \$12 to \$16.50 per ton."

Table 163.—Sales and Shipments* of Canadian Asbestos, 1941 and 1942

	1941		1942	
	Tons	\$	Tons	\$
Crudes.....	2,846	980,217	2,889	1,233,184
Fibres.....	223,767	14,812,871	199,829	15,339,128
Shorts.....	251,233	5,675,752	236,741	6,090,971
Total.....	477,846	21,468,840	439,459	22,663,283
Sand, gravel, and stone (waste rock only) (a).....	8,454	6,805	8,090	7,925

(*) All from the province of Quebec.

(a) This production is included under the sand and gravel industry.

Table 164.—Asbestos Rock Mined and Milled, 1941-1942

	1941	1942
	Tons	Tons
Quantity of rock mined.....	7,707,367	8,233,516
Quantity of rock milled.....	6,366,670	6,795,459

Table 165.—Consumption of Asbestos in Specified Canadian Industries, 1940-1942

Industry	1940		1941		1942	
	Quantity	Cost at works	Quantity	Cost at works	Quantity	Cost at works
		\$		\$		\$
Electrical apparatus and supplies—						
Board..... pound	357,372	61,316	(a)	94,353	(a)	97,604
Yarn..... pound	103,932	36,895	131,787	38,712	(a)	13,597
Tape..... pound	29,771	27,708	31,722	29,613	(a)	16,690
Boilers, tanks and engines.....		10,114		24,378	(a)	38,043
Asbestos Products—						
Fibre.....		See Asbestos Products Industry				
Other forms.....		See Asbestos Products Industry				
Roofing paper..... ton	2,545	103,810	1,945	59,880	755	17,493
Cotton goods, n.e.s..... pound	10,395	578	10,887	607	20,515	1,118
Woollen goods, n.e.s..... pound	181,264	51,072	(a)	(a)	(a)	(a)

(a) Not reported.

Table 166.—Capital Employed in the Asbestos Industry in Canada, 1942

	\$
Present cash value of the land (excluding materials).....	2,683,551
Present value of buildings, fixtures, machinery, tools and other equipment.....	7,002,207
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	2,068,938
Inventory value of finished products on hand.....	1,325,050
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	5,661,618
Total.....	18,741,364

Table 167.—Principal Statistics of the Asbestos Mining Industry in Canada, 1940-1942

	1940	1941	1942
Number of firms.....	8	9	8
Capital employed..... \$	10,799,280	21,325,558	18,741,364
Number of employees—On Salaries (c).....	320	314	329
On Wages.....	3,566	3,446	3,420
Total.....	3,886	3,760	3,749
Salaries and wages—Salaries..... \$	641,770	679,394	731,836
Wages..... \$	4,086,932	4,316,707	4,567,618
Total..... \$	4,728,702	4,996,101	5,299,454
Selling value of products (a)..... \$	15,624,656	21,475,645	22,671,208
Cost of fuel and electricity..... \$	1,520,907	1,524,450	1,646,291
Cost of process supplies (b)..... \$	2,200,061	2,721,796	2,747,682
Net value of sales..... \$	11,903,688	17,229,399	18,277,235

(a) Includes value of sand and gravel.

(b) Explosives, drill steel, etc.

(c) In 1940 includes 40 females; 45 in 1941; and 60 in 1942.

Table 168.—Wage-Earners Employed, by Months, in the Asbestos Mining Industry in Canada, 1939-1942

Month	1939 Total	1940 Total	1941 Total	1942		
				Mine		Mill
				Surface	Underground	
January.....	3,121	3,634	3,072	1,109	619	1,638
February.....	3,227	3,614	3,148	1,084	619	1,640
March.....	3,081	3,465	3,194	1,066	635	1,634
April.....	3,212	3,587	3,138	1,092	620	1,650
May.....	3,272	3,707	3,198	1,117	627	1,636
June.....	3,544	3,804	3,290	1,141	625	1,611
July.....	3,631	3,811	3,654	1,218	621	1,641
August.....	3,697	3,799	3,640	1,215	624	1,644
September.....	3,737	3,723	3,806	1,232	624	1,654
October.....	3,714	3,278	3,821	1,235	632	1,605
November.....	3,826	3,190	3,756	1,194	641	1,697
December.....	3,737	3,180	3,740	1,119	633	1,571

THE ASBESTOS PRODUCTS INDUSTRY IN CANADA, 1942

Production by the manufacturers of asbestos goods in Canada in 1942 was valued at \$5,101,259, an increase of 17 per cent over the 1941 total of \$4,359,217. Products made included brake linings valued at \$1,955,009, boiler and pipe covering at \$532,574, clutch facings at \$203,071, asbestos packings at \$241,929 and such other lines as asbestos gaskets, cloth, yarn, dryer felts, cement, etc.

Thirteen factories were engaged in this industry, of which 6 were located in Quebec, 6 in Ontario and 1 in Nova Scotia. Fixed and working capital as represented by these works totalled \$3,732,834; the number of employees averaged 870 for each month of the year and payment in salaries and wages for the year amounted to \$1,167,961. Expenditures for fuel and electricity totalled \$179,253 and materials for manufacturing cost \$2,392,492.

Table 169.—Materials Used in the Asbestos Products Industry, 1941 and 1942

Material	Unit of measure	1941		1942	
		Quantity	Cost at Works	Quantity	Cost at works
Asbestos fibre.....	Lb.	25,098,964	446,301	24,214,105	503,340
Asbestos cloth.....	Lb.	123,403	46,782	62,638	21,037
Asbestos paper, corrugated and plain.....	Lb.	779,548	22,037	522,999	25,548
Asbestos sheets and strips.....	Lb.	36,428	19,686	38,642	21,220
Asbestos yarn.....	Lb.	449,523	170,136	543,915	217,946
Cotton cloth and yarn.....	\$		139,256		164,670
Rubber.....	Lb.	186,034	46,026	86,787	18,877
Containers and packing material.....	\$		95,476		70,173
All other materials.....	\$		881,095		1,349,681
Total.....	\$		1,866,795		2,392,492

Table 170.—Products Manufactured in the Asbestos Products Industry, 1941 and 1942

Product	Unit of measure	1941		1942	
		Quantity	Cost at works	Quantity	Cost at works
Asbestos brake linings—Moulded.....	Ft.	4,690,883	\$ 1,172,076	4,590,036	\$ 1,551,105
Other.....	Ft.	1,179,926	199,715	1,492,199	403,904
Asbestos boiler and pipe covering.....	Ft.	4,122,646	611,431	4,446,893	532,574
Asbestos clutch facings.....	No.	716,978	199,846	628,649	203,071
Asbestos gaskets.....	Lb.	55,638	31,618	66,213	38,318
Asbestos packings of all kinds.....	Lb.	519,533	224,870	559,828	241,929
All other products (x).....			1,919,661		2,130,358
Total.....			4,359,217		5,101,259

(x) Includes products made by 1 or 2 firms, such as asbestos dryer felt, hydraulic brake hose, asbestos shingles, asbestos yarn, packings of rubber, duck and flax, asbestos paper, asbestos cloth, etc.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this chapter. Since 1936, corresponding statistics relating to the production of nepheline syenite have been included with those pertaining to the commercial production of feldspar and quartz.

During 1942 the gross value of production by the industry, and comprising the value of feldspar, quartz and nepheline syenite sold, totalled \$1,998,996 compared with corresponding values of \$1,838,054 in 1941 and \$1,508,999 in 1940. In 1942 commercial shipments of feldspar were made only from properties located in Ontario and Quebec; quartz (silica) in various forms was produced in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia, while production of nepheline syenite was confined to the province of Ontario.

The number of firms reported as active in the industry in 1942 totalled 36; capital employed was recorded at \$2,563,248; employees numbered 533; salaries and wages amounted to \$782,903 and the value of fuel, electricity and process supplies totalled \$412,028. The net value of all products sold in 1942 was estimated at \$1,586,968 compared with \$1,587,071 in 1941.

FELDSPAR

Production (producers' sales) of feldspar, crude and ground, during 1942 totalled 22,270 net tons valued at \$213,941 compared with 26,040 net tons worth \$244,284 in 1941. Of the 1942 output, 16,802 net tons were shipped from Quebec properties and 5,468 net tons from quarries in Ontario. The following information is from a recent report issued by the Bureau of Mines, Ottawa:

"Most of the Canadian feldspar mined is of high-potash grade, though some operators also produce small amounts of high-soda spar. The latter type is rather uncommon as large deposits, but is sometimes found as zonal bodies in potash-feldspar pegmatites, especially along the walls.

"Most of the recorded production has come from adjacent sections of western Quebec and eastern Ontario, in the general Ottawa region, with a small amount, also, from scattered properties in Ontario as far west as the Parry Sound and Sudbury districts. Manitoba also formerly had a small production from the Winnipeg River district, but operations ceased there about six years ago. Formerly, a considerable part of the supply came from a number of small, scattered, and often intermittent operations, but in recent years most of it has come from a few larger deposits, the production being about equally divided between Ontario and Quebec. In 1942, however, the Ontario output declined to only about 30 per cent of the total.

"All of the feldspar used in industry is crushed or finely ground material, usually prepared either in mills operated by producers of the crude mineral or in merchant mills supplied from independent mines. Some manufacturers of ceramic products mine and grind spar for their own use.

"By far the greater part of the feldspar production is used in the ceramic industries, of which the glass trade is the largest consumer, followed by the pottery, enamel, and sanitary ware industries. In the United States, these industries used 98 per cent of total sales in 1940. Minor amounts are used in the manufacture of soaps and cleansers, abrasive wheels, and artificial teeth. A novel use recently proposed for feldspar is for smothering incendiary bombs, and has been patented by the United States Government. A low-fluxing, soda type of spar is preferred, free of material finer than 200-mesh, and is claimed to have extinguishing properties superior to common sand or any special mixtures recommended for such purpose.

"Domestic feldspar prices in 1942 showed no change from previous years. Quotations for No. 1 grade crude continued at \$5.50 to \$6.00 per ton, f.o.b. rail, for domestic mills and export. Ground spar, 200-mesh, sold at \$16 to \$18, and granular glass spar at \$12, both f.o.b. mill, in carload lots.

"Crude feldspar entering the United States pays a duty of 25 cents per long ton. The duty on ground feldspar is 15 per cent ad valorem."

Table 171.—Feldspar Consumed in Specified Canadian Industries, 1940, 1941 and 1942

Industry	1940		1941		1942	
	Tons	\$	Tons	\$	Tons	\$
Abrasive products.....	68	2,056	84	3,127	419	4,113
Imported clay products.....	3,305	70,788	3,333	74,247	2,799	62,525
Soaps and cleaning preparations.....	1,085	11,427	3,593	34,411	4,249	43,904
Iron and steel products.....	542	9,774	(x)	15,683	.....	.....
Glass.....	350	5,744	909	16,656	2,874	45,231
Enamelling materials.....	400	6,000	523	7,845	331	4,965

(x) Quantity statistics not available.

NEPHELINE SYENITE

Producers' sales of nepheline syenite were valued at \$246,893 in 1942 compared with \$227,583 in 1941. Commercial production of nepheline syenite in Canada is confined to Eastern Ontario. Shipments during the year under review were made by the American Nepheline Corporation Limited and the Canadian Flint & Spar Company Limited. The first-named company operated its quarry located on Lot 14, Concession 9 of Methuen township, Peterborough county, throughout the year, milling operations were steady and the company marketed its products in both the crude and refined state. Canadian Flint & Spar Company Limited carried on quarrying operations at its property located near Bancroft from May to November; the output from this quarry was shipped in the crude state to the United States.

The following information was abstracted from a report prepared by the Bureau of Mines, Ottawa:

"Nepheline syenite is a quartz-free crystalline rock consisting essentially of the mineral nephelite, a silicate of alumina, potash, and soda, with albite and microcline feldspar. It often contains varying amounts of iron-bearing minerals in the form chiefly of black mica and magnetite, together with such accessory minerals as zircon, corundum, calcite, scapolite, etc. It has no free silica, and is high in alumina (20 to 30 per cent in average commercial rock) as compared with straight feldspar (17 to 20 per cent), and it has thus found favour with the ceramic industries, particularly in the glass trade. For ceramic use the crude rock must be freed of its iron-bearing constituents, removal of which can often be readily effected by a relatively cheap process of magnetic separation at about 20-mesh size.

"Nepheline syenite continues to be used chiefly in the glass trade where it is preferred to straight feldspar because of its higher content of alumina. Most Canadian glass plants now use the material and it also employed by a number of American plants. Some American feldspar grinding establishments use the syenite for blending with their granular glass spar. It is claimed that 1,500 pounds of syenite will replace 2,000 pounds of spar in the glass batch on the basis of relative alumina content and the higher content of alkalis reduces the temperature of melting, with resultant saving of fuel and longer tank life. Research has been proceeding steadily on applications for nepheline syenite in other branches of ceramics and it has been found of advantage owing to its higher fluxing action as a body ingredient in a variety of products, including pottery, semivitreous ware, sanitary and electrical porcelain, floor and wall tile, and structural clay products, as well as enamels. Increased vitrification, translucency, and mechanical strength, improved glaze fit, and reduced absorption, warpage, thermal expansion, and crazing, are among the desirable properties claimed for the various types of ware made from it.

"Interest has been shown in the possibility of employing nepheline syenite as a source of alumina for the aluminium industry to replace bauxite, all of which is imported. Frobisher Exploration Company, Limited (Ventures) conducted an intensive geological and diamond drilling program in 1941 on the nepheline syenite occurrences of the Bancroft area, Ontario and test work has been proceeding in the laboratories of the Bureau of Mines, Ottawa, on methods of treating the rock for recovery of the contained alumina, potash, and soda. Large deposits of nepheline syenite are also known to exist on the north shore of Lake Superior.

"The fine dust product resulting from the processing of Lakefield syenite is used as a substitute for pumice, for grinding and polishing, and in the cleanser, enamelware, and heavy clay industries.

"Glass-grade nepheline syenite for sale in Canada remained at the 1941 price of \$11.75 per ton, bulk, in carload lots, f.o.b. Lakefield, with ground, 200-mesh, ceramic grade quoted at \$16.50. Grade B (dust) sold for \$13.00 l.c.l. American prices also remained unchanged, at \$12.00 for glass grade, and \$15.50 for ceramic grade, all bulk, in carload lots, f.o.b. Rochester, New York."

Nepheline syenite used in Canada in the manufacture of glass totalled 3,472 tons valued at \$58,629 in 1939, 4,233 tons at \$69,619 in 1940, 5,834 tons worth \$94,091 in 1941 and 6,144 tons worth \$100,417 in 1942.

QUARTZ (SILICA)

The production of natural silica or quartz in Canada during 1942 totalled 1,738,174 short tons valued at \$1,538,162 compared with 2,052,878 tons at \$1,366,187 in 1941. Output of primary silica products by the Canadian quartz mining industry includes crude and crushed dyke quartz, quartzite, sandstone and natural silica sands and gravels. The mineral in one or more of the forms thus defined was produced during 1942 in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia. Shipments of silica in Nova Scotia were made to steel plants largely for the making of silica brick. In Quebec, high-grade silica sands were produced for the manufacture of glass and chemicals while a considerable tonnage of these same sands was sold for sand-blasting and various other purposes; in the same province relatively large quantities of crushed quartzite were mined and milled for the manufacture of silicon carbide and other products. The greater part of the tonnage of silica shipped in Ontario during 1942 represented material intended for use in the production of silica brick and ferro-silicon and for the fluxing of nickel-copper ores. Quartz production as recorded for Saskatchewan represented low-grade natural silica sands or gravels shipped as flux to the Flin Flon smelter of the Hudson Bay Mining and Smelting Co. Ltd. Production in British Columbia in 1942 consisted of quartz shipped to the Trail smelter from the Gypo and Ballarat deposits located near Penticton.

The price per ton of the several grades of silica varies greatly depending on its purity and on the purpose for which it is to be used. Silica generally is a low-priced commodity, and therefore the situation of a deposit with respect to markets is of great importance. The largest markets for silica are in the provinces of Quebec and Ontario, and new deposits to be of interest to these markets should be within economic reach of either Toronto or Montreal. In Western Canada the main markets are in Alberta and Manitoba.

Quotations as given by "Canadian Chemistry and Process Industries" are: silica sand, various grades, in car lots \$9 to \$9.50 a ton; silica, quartz, 99 per cent, 110-220 grade, in car lots, \$14 to \$20 per ton.

Table 172.—Production in Canada of Quartz, 1941 and 1942

	1941		1942	
	Short tons	Value	Short tons	Value
		\$		\$
PRODUCTION (x) (SHIPMENTS)—				
Nova Scotia.....	11,477	24,100	10,708	23,557
Quebec.....	147,318	388,948	203,219	543,817
Ontario.....	1,745,244	899,687	1,367,733	914,256
Saskatchewan.....	148,208	51,873	155,699	54,495
British Columbia.....	631	1,579	815	2,037
Canada.....	2,052,878	1,366,187	1,738,174	1,538,162

(x) Includes both crude and crushed quartz, crushed sandstone and quartzite, and natural silica sands.

Table 173.—Production* (Use) of Natural Low-Grade Silica Sand and Silica Gravel as Non-Ferrous Smelter Flux 1940-1942

	1940		1941		1942	
	Tons	\$	Tons	\$	Tons	\$
Ontario.....	1,403,268	491,144	1,533,392	536,687	644,529	225,585
Saskatchewan.....	159,090	55,681	148,208	51,873	155,699	54,495
Canada.....	1,562,358	546,825	1,681,600	588,560	800,228	280,080

* Included in totals shown in Table 174 also, complete data for production of this material in Ontario previous to 1936 are not available.

Prices—UNITED STATES (May, 1941 to April, 1943)—Silica, per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air floated, 325 mesh, 92 to 99½ per cent silica, \$18 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton; moulding sand, 50 cents to \$3.50; blast sand, \$1.75 to \$6. California: \$5 for quartz and \$2.50 for sand. Quartz rock crystals for fusing, all sizes, \$100 to \$150 per ton; prisms for piezoelectrical and optical use command premium. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

Table 174.—Consumption of Quartz, Silica Sand, etc., in Canada, by Industries, According to Census of Industry Reports, 1941 and 1942*

	1941		1942	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Silica sand and silica (including ground quartz or quartzite)—				
Soaps and cleaning preparations.....	4,347	92,870	2,462	84,017
Acids and salts.....	24,327	109,402	30,356	124,598
Paints.....	1,019	39,365	1,310	45,440
Refractories.....	878	7,252	1,072	10,680
Roofing paper.....	2,641	15,135	2,879	16,854
Abrasives (silica sand).....	57,362	269,605	76,943	416,806
Abrasives (quartz).....	174	6,824	230	7,640
Glass.....	114,761	713,677	145,005	928,587
Enamelling materials.....	595	8,925	331	4,965
Products from imported clays.....	4,055	63,116	3,753	63,259
Foundry facings and supplies.....	99	1,242	78	864
Non-ferrous smelters†.....	1,682,231	590,139	1,298,803	582,247
Steel industry (silica sand).....	82,701	573,305	112,878	811,659
Ferro-alloys (quartzite).....	164,390	390,619	176,444	475,444
Total Accounted for.....	2,139,280	2,881,276	1,852,544	3,578,060

NOTE:—Consumption values are costs at works.

† The quantities reported under this industry usually contain low-grade natural silicious sands used for fluxing purposes.

* In addition to the quantities shown, a relatively large quantity of quartz and quartzite is consumed in the manufacture of silica brick.

Table 175.—Principal Statistics of the Feldspar and Quartz Mining Industry, 1941 and 1942

	Ontario (*) (b)		Quebec	
	1941	1942	1941	1942
Number of firms (a).....	18	17	20	19
Capital employed..... \$	650,405	1,452,823	1,664,177	1,110,425
Number of employees—On salary.....	17	24	15	22
On wages.....	207	234	267	253
Total.....	224	258	282	275
Salaries and wages—Salaries..... \$	25,210	39,186	26,927	52,081
Wages..... \$	253,443	333,791	304,909	357,845
Total..... \$	278,653	372,977	331,836	409,926
Selling value of products (gross)..... \$	1,311,946	1,290,591	526,108	708,405
Cost of fuel and purchased electricity..... \$	42,709	53,261	48,456	70,839
Cost of process supplies..... \$	97,954	204,167	61,864	83,761
Net value of sales..... \$	1,171,283	1,033,163	415,788	553,805

(*) In 1941 and 1942 includes 1 firm in Nova Scotia, 1 in British Columbia and 1 in Saskatchewan.

(a) Small shippers from whom reports were unobtainable and whose production is recorded from consumers' returns are sometimes not included in the total.

(b) Includes data relating to production of nepheline-syenite.

Table 176.—Capital Employed in the Feldspar and Quartz Mining Industry, in Canada, 1942

	Quebec	Ontario
	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—		
Present cash value of the land (excluding minerals).....	122,885	80,452
Present value of buildings, fixtures, machinery, tools and other equipment.....	825,963	1,127,146
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	73,421	223,433
Inventory value of finished products on hand.....	12,070	5,741
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	76,086	16,051
Total.....	1,110,425	1,452,823

Table 177.—Number of Wage-Earners on Pay Roll, by Months, 1941 and 1942

Month	1941	1942					
		Quebec			Ontario		
		Surface	Under-ground	Mill	Surface	Under-ground	Canada*
January.....	290	155	55	64	126	24	458
February.....	297	166	46	65	127	24	446
March.....	336	142	32	65	128	23	449
April.....	432	130	27	66	151	15	447
May.....	553	181	27	80	159	20	546
June.....	579	161	30	81	172	24	544
July.....	587	157	17	80	178	19	531
August.....	604	144	10	85	176	29	526
September.....	551	159	13	83	178	12	522
October.....	537	152	12	91	162	12	507
November.....	549	151	4	82	149	11	473
December.....	477	128	4	68	119	28	362

*Includes a few employees in some months in Nova Scotia. Complete data relating to quartz production in British Columbia in 1941 and 1942 are not available.

QUARTZ CRYSTAL

(United States Bureau of Mines)

"Modern mechanized warfare depends upon instantaneous two-way radio communication, which to be effective must rely upon accurately ground wafers of crystal, two in each circuit; dozens are needed for a single tank or airplane. Brazil remains the only known commercial source of quartz suitable for radio-frequency control, and radio quartz crystal has been classified as a strategic mineral by the Army and Navy Munitions Board.

"Quartz crystals of commercial size, found near Hot Springs, Ark., almost without exception show twinning, and crystal plates made from them do not have piezoelectric properties unless the twinned portion is cut away—a costly process. Cracks and inclusions of other minerals and of air render most domestic crystals and fragments subject to rejection, even before examination for piezoelectric properties.

"In Brazil, the annual production of quartz crystal jumped to over 1,000 short tons in 1940 from about 250 tons in 1937. One-fourth of the output is consumed as piezoelectric (radio) quartz, and the remainder is used as optical, instrument, or fusing quartz. Before 1941 Japan's purchases were the backbone of the Brazilian crystal industry. The United States had comparatively small peacetime requirements and bought only high-grade material.

"In 1941 the Governments of the United States and Great Britain agreed to buy all stocks of Brazilian quartz crystals remaining after their nationals had made purchases for private industry. The Brazilian Department of Mineral Production, Ministry of Agriculture, introduced export control through licences and levied a 10 per cent tax based upon export prices. Exports may clear only through the ports of Rio de Janeiro and Salvador.

"A schedule of prices for the various grades of crystal as of April 1941 has been reported. For example, "A" (piezoelectric)-grade crystals weighing 1.5 to 2.0 kilograms with growth faces were quoted at 250,000 milreis a kilogram (about \$6, United States currency, a pound). Owing to tremendous increases in demand and slight revision in specifications for oscillator plates, many of the manufacturers began to use smaller crystals down to 200 grams each. Prices of larger crystals advanced as much as threefold during the year, but even at the peak these represented only a minor factor in the cost of the final product."

No commercial production of quartz crystals has ever been officially reported in Canada. Imported crystals, however, are now being cut and dressed in the Dominion.

According to a report issued by the Engineering and Mining Journal, New York, April, 1943, an inspection laboratory has been established in Rio de Janeiro, Brazil, by the United States Signal Corps for the selection of suitable quartz crystals. Deposits of quartz crystals have been worked in four regions in Brazil, including the poorly accessible Tocantins River district. Veins are located by independent pick-and-shovel prospectors who mine the crystals by crude hand methods. Quartz rock crystals for fusing, all sizes, were quoted in the United States, April, 1943—\$100 to \$150 per ton. Prisms for piezoelectrical and optical use command a substantial premium.

In 1943 it was reported that the Rare Minerals Prospecting Syndicate was developing a quartz crystal property located in Leeds county, Ontario.

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

Production (producers' sales and consumption) of gypsum in Canada during 1942 totalled 566,166 short tons valued at \$1,254,182 compared with 1,593,406 short tons at \$2,248,428 in 1941. The tonnage in both years represents various grades of crude gypsum and anhydrite shipped from quarries or mines together with the tonnage of calcined gypsum used in or shipped from quarries or "primary" plants. The quantity of the mineral produced in 1942 was 64.5 per cent less than in the preceding year, due chiefly to a shortage of shipping on the Atlantic coast.

Of the 1942 output, Nova Scotia properties contributed 394,216 tons valued at \$512,762; Ontario, 82,796 tons at \$304,170; New Brunswick, 36,623 tons at \$111,316; Manitoba, 29,218 tons at \$179,780, and British Columbia, 23,313 tons worth \$146,154.

The quantity of crude gypsum mined in 1942 totalled 794,886 tons while the tonnage of anhydrite mined (all in Nova Scotia) amounted to 2,240 tons. Crude gypsum calcined in primary or quarry plants totalled 183,296 tons.

The following are the average prices per short ton for mine shipments made during 1942: Crude lump, \$1.69; crushed crude, \$1.30; ground crude, \$7.52, and calcined, \$13.95.

In 1942 the number of firms reporting production was 7 and the gypsum quarries and mines in operation totalled 13. Some of the Canadian gypsum mining companies confine their operations in the Dominion to the production and sale of crude gypsum, or anhydrite, while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants. Gypsum is exported from Canada almost entirely in the crude form.

Capital employed by Canadian gypsum mining companies totalled \$4,386,531 in 1942; employees aggregated 510; salaries and wages paid amounted to \$657,620 and the total value of fuel, purchased electricity and process supplies used was computed at \$244,139.

Gypsum mining operations in Nova Scotia during 1942 are summarized as follows: Victoria Gypsum Company Limited operated its property at Little Narrows, Victoria County, from May 4 until October 31; shipments were confined to the mineral in the crude lump form. No mining operations were conducted in Nova Scotia during 1942 by Gypsum, Lime & Alabastine, Canada, Limited. At Windsor, the manufacturing plant of the Windsor Plaster Company Limited was in continuous operation throughout the year; gypsum for this plant came from the Mosher quarry which was active for nine months in the year. Both the quarry and mill of the Canadian Gypsum Company Limited, located at Wentworth, were operated during the entire year. Production at this property included both anhydrite and gypsum and the minerals were shipped in the crushed state. The National Gypsum (Canada) Ltd. made shipments in 1942 from quarries located at Walton and Dingwall, but only milling operations were conducted at its Belle Marche property in Inverness County. Shipments of crude lump gypsum, for export, were made by the Connecticut Plaster Company; the quarry of this company is located at Cheverie.

Gypsum production in New Brunswick in 1942 came entirely from Hillsborough where the quarry and manufacturing plant of the Canadian Gypsum Company were in steady production throughout the year. Both surface and underground mining operations are carried on at this property and various gypsum products are manufactured by the company.

In Ontario, gypsum mining during 1942 was confined to Haldimand county. Two companies operated in this area, Gypsum, Lime & Alabastine, Canada, Limited, at Caledonia, and the Canadian Gypsum Company Limited at Hagersville. These companies, in addition to conducting both surface and underground mining, produced an extensive variety of gypsum products. Operations by these firms were continuous throughout the year.

Gypsum was mined in Manitoba during 1942 at Gypsumville by Gypsum, Lime & Alabastine, Canada, Limited, and at Amaranth by Western Gypsum Products Limited. These companies also operated manufacturing plants in the city of Winnipeg.

The production of gypsum in British Columbia in 1942 came entirely from the Falkland deposits where the property of Gypsum, Lime & Alabastine, Canada, Limited was operated from January to December. The manufacturing plant of the company, located at New Westminster, was in steady production during the year under review.

The following information is from a report on gypsum prepared by the Bureau of Mines, Ottawa:

"Gypsum is marketed in the crude lump form, ground as 'land plaster' and 'Terra alba', or ground and calcined, as plaster of Paris or wall plaster. Each year an increasing portion of the calcined material enters into the manufacture of wallboard, gypsum blocks, insulating material, acoustic plaster, etc. Anhydrite is used mainly as a fertilizer for the peanut crop in the Atlantic seaboard states of the southern United States.

"The use of anhydrite for the manufacture of sulphuric acid, ammonium sulphate, cement and special plasters is increasing, and, normally, there is a good opportunity for the Canadian material in this market. Canada has extensive deposits, favourably situated for commercial development, the material from which has been proved by tests carried out by the Department of Mines and Resources to be of excellent grade. Prior to 1937 the small Canadian production was exported principally for use as a fertilizer for the peanut crop, but it is possible that an industry will eventually be started in this country in which the anhydrite may be used for the manufacture of sulphur or sulphur compounds and of special plasters, similar to those being marketed in England.

"The use of gypsum products in the building trades has made rapid progress because of their lightness, durability, fire-resisting, insulating, and acoustic properties; and tiles, wallboards, blocks, and special insulating and acoustic plasters have been developed. It is probable that production of gypsum for domestic use will continue to decline during the war. As most of the crude gypsum is shipped to the United States for the manufacture of gypsum products, industrial conditions in that country will continue to have an important bearing on the industry.

"Crude gypsum is a low-priced commodity, and its selling price f.o.b. quarry is dependent largely upon the quantity produced and the production facilities available. For export, contracts are generally made with the producer for the year's requirements of the purchaser and these contracts are generally made early in each year. The price of crude gypsum as quoted by the Canadian Chemistry and Process Industries remained at \$2.50 to \$3.50 per ton f.o.b. mine throughout 1942.

"A large tonnage of by-product gypsum is obtained from the production of phosphate fertilizers at the plant of Consolidated Mining & Smelting Company, at Tadanac, British Columbia, and efforts to find an outlet for this material are being continued."

Table 178.—Production in Canada, of Gypsum, 1941 and 1942

	1941		1942	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
SHIPMENTS BY GRADES—				
Crude (1)—Lump or mine run.....	39,776	52,156	13,176	22,240
Crushed.....	1,396,364	1,541,431	402,578	523,093
Fine ground.....	277	2,061	246	1,849
Calcined gypsum, sold and used (2).....	156,989	652,780	150,166	707,000
Total.....	1,593,406	2,248,428	566,166	1,254,182
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	1,395,172	1,517,297	394,216	512,762
New Brunswick.....	56,172	150,580	36,623	111,316
Ontario.....	90,599	276,459	82,796	304,170
Manitoba.....	27,601	162,822	29,218	179,780
British Columbia.....	23,862	141,320	23,313	146,154
Total.....	1,593,406	2,248,428	566,166	1,254,182
Total gypsum mined and quarried (1).....	1,560,440		797,126	
Total gypsum calcined (2).....	197,413		183,296	

(1) Includes some anhydrite quarried in Nova Scotia.

(2) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary, but includes calcine used in manufacturing plants operated in direct conjunction with the mines—the value of calcine used is its value as a process material.

Table 179.—Consumption of Gypsum in Canadian Cement Industry, 1933-1942

Year	Tons	Year	Tons
1933.....	13,319	1938.....	51,975
1934.....	19,172	1939.....	31,492
1935.....	21,611	1940.....	38,903
1936.....	25,447	1941.....	49,031
1937.....	33,691	1942.....	49,816

Table 180.—Principal Statistics of the Gypsum Mining Industry in Canada, 1939-1942

	Nova Scotia	New Brunswick, Ontario, Manitoba, British Columbia	Total Canada
Number of firms— 1939.....	7	3(a)	10
1940.....	6	3(a)	9
1941.....	6	2(a)	8
1942.....	5	2(b)	7
Capital employed— 1939..... \$	4,370,893	2,436,014	6,806,907
1940..... \$	2,406,561	2,242,101	4,648,662
1941..... \$	2,812,465	2,363,356	5,175,821
1942..... \$	1,913,131	2,473,400	4,386,531
Number of employees—On salary—			
1939.....	29	37	66
1940.....	33	24	57
1941.....	34	14	48
1942.....	28	27	55
On wages—			
1939.....	440	208	648
1940.....	389	248	637
1941.....	328	272	600
1942.....	201	254	455
Salaries and wages—Salaries—			
1939..... \$	53,680	59,235	112,915
1940..... \$	60,374	51,048	111,422
1941..... \$	62,083	28,852	90,935
1942..... \$	53,314	53,163	106,477
Wages—			
1939..... \$	402,134	177,109	579,243
1940..... \$	369,090	237,154	606,244
1941..... \$	338,356	315,717	654,073
1942..... \$	231,431	319,712	551,143
Fuel and electricity—Cost—			
1939..... \$	90,394	103,094	193,488
1940..... \$	76,224	118,740	194,964
1941..... \$	73,784	148,780	222,564
1942..... \$	36,831	141,851	178,682
Value of process supplies used—			
1939..... \$	85,166	20,665	105,831
1940..... \$	194,005	29,370	223,375
1941..... \$	199,875	29,569	229,444
1942..... \$	34,784	30,673	65,457
Selling value of products (gross)—			
1939..... \$	1,340,830	594,297	1,935,127
1940..... \$	1,302,347	763,556	2,065,903
1941..... \$	1,517,297	731,131	2,248,428
1942..... \$	512,762	741,420	1,254,182

(a) Includes 2 companies also operating in Nova Scotia.

(b) Includes 1 company also operating in Nova Scotia.

Table 181.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1942

	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
Capital employed as represented by—	\$	\$	\$
Present cash value of the land (excluding minerals).....	26,005	195,844	221,849
Present value of buildings, fixtures, machinery, tools and other equipment.....	399,074	854,978	1,254,052
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	107,576	145,382	252,958
Inventory value of finished products on hand.....	454,999	57,841	512,840
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)....	925,477	1,219,355	2,144,832
Total.....	1,913,131	2,473,400	4,386,531

Table 182.—Number of Wage-Earners on Payroll or Time Record of the Last Day of Each Month or Nearest Work Day, 1941-1942

Month	1941		1942			
	Mine	Mill	Mine		Mill	
			Surface	Under-ground*	Male	Female
January.....	210	128	117	77	171	2
February.....	205	125	131	79	182	2
March.....	232	142	183	83	199	2
April.....	413	219	187	83	213	2
May.....	481	197	254	82	220	4
June.....	528	224	256	75	236	4
July.....	566	216	263	82	222	4
August.....	483	236	259	79	223	4
September.....	505	228	195	73	181	3
October.....	445	229	115	73	165	4
November.....	423	229	108	83	163	3
December.....	368	170	70	87	138	3

*Underground work confined to New Brunswick, Ontario and Manitoba.

(2) The Gypsum Products Industry

Nine Canadian factories, operated by four companies, manufactured gypsum products having a factory selling value of \$4,829,962 during 1942. This output was 4.9 per cent over the 1941 total of \$4,601,093 and 17.4 per cent over the 1940 value of \$4,110,795. The main products were gypsum wallboard, gypsum hardwall plaster, gypsum tile and gypsum blocks.

Capital employed in these nine manufacturing plants amounted to \$3,414,258 in 1942, including \$1,578,655 as the value of buildings and equipment, \$614,502 as the value of inventories at the year-end, and \$1,221,101 as cash, bills receivable, etc. The average number of employees in 1942 was 412, to whom \$554,665 was paid in salaries and wages. Expenditures for fuel and electricity amounted to \$217,007 while materials used in manufacturing processes cost \$2,251,434.

Table 183.—Materials Used in the Gypsum Products Industry, 1941 and 1942

Material	Unit of measure	1941		1942	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Gypsum, crude.....	ton	30,978	112,158	20,742	78,460
Gypsum, calcined (plaster of Paris).....	ton	157,488	628,325	149,885	705,541
Paper.....	ton	13,106	718,914	14,240	868,457
Starch or paste.....	ton	487	42,310	499	31,488
Hair.....	ton	122	23,293	75	18,036
Retarder.....	ton	286	23,330	203	18,045
Sawdust or shavings.....	ton	751	5,481	165	2,259
Containers, etc.....			124,660		108,587
All other materials.....			262,581		420,561
Total.....			1,941,052		2,251,434

Table 184.—Output of the Gypsum Products Industry, 1941 and 1942

Product	Unit of measure	1941		1942	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	154,760,145	3,255,618	164,410,695	3,849,253
Gypsum hard wall plasters.....	ton	80,216	1,043,864	51,475	682,528
All other products (*).....			301,611		298,181
Total.....			4,601,093		4,829,962

(*) Includes gypsum tile and blocks, etc.

IRON OXIDES (OCHRE) MINING INDUSTRY

Production (producers' sales) in Canada of iron oxides and ochres, crude and refined, during 1942 totalled 9,304 short tons valued at \$151,653 compared with 10,045 short tons worth \$142,069 in 1941. Of the 1942 output, 8,866 short tons valued at \$147,049 came from properties in the province of Quebec and the balance of 438 tons at \$4,604 represented crude material shipped from deposits located in British Columbia.

Production during 1942 in the province of Quebec was reported by the Sherwin-Williams Co. Ltd., operating deposits at Red Mill, Champlain County; Chas. D. Girardin at Alnaville, Lavolette County and Les Forges, St. Maurice County; Thos. H. Argall at Pointe du Lac, St. Maurice County, and Mauricy Oxide Co. at Ste. Adelphe, Champlain County. Refined or calcined products were manufactured and shipped by the Sherwin-Williams Co. Ltd., whereas the other operators shipped the mineral in the crude state. In British Columbia, shipments of crude oxides were made by J. G. Davidson from deposits located at Alta Lake.

The industry provided employment for 47 employees and distributed \$44,288 in salaries and wages. Most of the deposits were operated from June to September with the exception of one which was worked from April 6 to December 29.

The Bureau of Mines, Ottawa, reports that other deposits in Quebec and Ontario could be worked if the demand warranted their development. In Nova Scotia, beds of ochre and umber were operated to a small extent in the past. In Alberta and Saskatchewan, several deposits of ochre are known, some having commercial possibilities, but, as they are difficult of access and as the market is limited, they have had little development. Large deposits near Grand Rapids and Cedar Lake in northern Manitoba remain undeveloped for similar reasons.

Ochreous iron oxide, which is sold uncalcined and used chiefly in the purification of illuminating gas, comprises the bulk of the minerals produced in Canada under this category. The calcined form of ochreous iron oxide is used in the manufacture of paints. A smaller quantity of natural iron oxides associated with clay-like materials in the form of umbers and siennas is produced in the raw and in the calcined state for use as pigments in paints.

The price in New York of iron oxide, standard No. 1-quality, Spanish red, remained normally at 3 to 5 cents per pound throughout 1941. The average Canadian price of red iron oxide in 1942, as given by Canadian Chemistry and Process Industries, was 2 to 7 cents a pound.

Table 185.—Production (Sales) in Canada of Iron Oxides, 1941 and 1942

	1941		1942	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
Quebec*.....	9,770	139,185	8,866	147,049
British Columbia.....	275	2,884	438	4,604
Total.....	10,045	142,069	9,304	151,653

* Includes crude and refined grades.

Table 186.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1942

Year	Coke and gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons (c)	\$
1932.....	3,736	35,284	701	52,323	512	48,047
1933.....	2,734	29,076	504	43,826	491	43,671
1934.....	3,757	47,010	580	53,539	544	53,236
1935.....	3,701	46,204	990	77,758	564	56,219
1936.....	(d)	41,291	733	67,650	634	65,819
1937.....	(d)	40,414	890	81,709	566	49,082
1938.....	(d)	41,013	822	70,736	487	41,062
1939.....	(d)	35,417	882	80,274	523	46,134
1940.....	5,417	42,491	1,146	112,826	575	62,636
1941.....	5,133	36,480	1,602	187,838	463	58,385
1942.....	4,600	33,790	2,354	253,383	412	52,155

(a) Oxide and purifying materials.

(b) Iron oxide pigments.

(c) Ochres, siennas and umbers.

(d) Data not available.

Table 187.—Principal Statistics of the Natural Iron Oxides Industry in Canada, 1940-1942

	1940	1941	1942
Number of firms.....	(b)7	(a)4	(d)5
Capital employed..... \$	195,263	189,877	194,541
Number of employees—On salaries.....	(c)5	(c)6	(e)6
On wages.....	41	37	41
Total.....	46	43	47
Salaries and wages—Salaries..... \$	7,896	8,571	9,174
Wages..... \$	30,946	33,581	35,114
Total..... \$	38,842	42,152	44,288
Selling value of products (gross)..... \$	111,874	142,069	151,653
Cost of fuel and purchased electricity..... \$	17,598	15,697	20,835
Cost of process supplies..... \$	435	5,697	5,780
Selling value of products (net)..... \$	93,841	120,675	125,038

(a) Three producing in Quebec and one in British Columbia.

(b) Five producing in Quebec and two in British Columbia.

(c) One female.

(d) Four producing in Quebec and one in British Columbia.

(e) Two females.

Table 188.—Capital Employed in the Iron Oxides Industry in Canada, 1942

	\$*
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of land (excluding minerals).....	35,776
Present value of buildings, fixtures, machinery, tools and other equipment.....	107,078
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	31,720
Inventory value of finished products on hand.....	14,967
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	5,000
Total.....	194,541

* Quebec only; data for 1 property in British Columbia not available.

Table 189.—Wage-Earners (*) Employed, by Months, 1941 and 1942

Month	Number				Month	Number			
	1941		1942			1941		1942	
	Mine	Mill	Mine	Mill		Mine	Mill	Mine	Mill
January.....		25	2	24	July.....	31	18	30	28
February.....		26		29	August.....	31	20	25	28
March.....		25		33	September.....	28	20	23	28
April.....		25	6	28	October.....	15	22	14	24
May.....	8	28	8	27	November.....	17	20	10	27
June.....	34	17	31	25	December.....	8	22	10	26

* No underground work and no female wage-earners.

THE MICA MINING INDUSTRY

Canadian production (mine and mill operators' shipments) of mica in 1942 totalled 6,019,671 pounds valued at \$383,567 compared with 3,487,891 pounds worth \$335,288 in 1941. Shipments during both years were made only from properties located in the provinces of Quebec, Ontario and British Columbia. Of the total output in 1942, mines in the province of Quebec contributed 2,657,044 pounds valued at \$285,263; Ontario mines, 2,800,627 pounds worth \$89,243, and British Columbia, 562,000 pounds appraised at \$9,061. The total for all grades of mica produced in Quebec and Ontario during the year under review included 5,412,834 pounds of amber or phlogopite and 44,837 pounds of muscovite. In the above referred to production totals are shipments of all grades of the mineral produced, including hand cobbled, thumb trimmed, splittings, knife trimmed, scrap and ground; production in British Columbia represents ground muscovite schist.

The number of Canadian mica operators reporting commercial shipments in 1942 totalled 96; capital employed by the industry amounted to \$1,460,769, and \$258,605 were distributed as salaries and wages to employees. The total net value of shipments was estimated at \$346,254.

Table 190.—Production of Mica in Canada, by Grades, 1941 and 1942

	1941			1942		
	Quantity	Value, f.o.b. shipping point	Price per pound	Quantity	Value, f.o.b. shipping point	Price per pound
	Pounds	\$	\$	Pounds	\$	\$
Rough cobbled.....	169,315	25,977	0-15	362,600	40,055	0-11
Knife-trimmed.....	264,409	144,356	0-55	264,858	177,628	0-67
Thumb-trimmed.....	139,577	19,738	0-14	67,292	19,334	0-29
Splittings.....	184,830	121,879	0-66	165,610	102,666	0-62
Scraps (*).....	2,729,760	23,338	0-009	5,159,311	43,884	0-0085
Total.....	3,487,891	335,288		6,019,671	383,567	

(*) Includes ground mica.

Table 191.—Production (Sales) of Mica in Canada, by Provinces and Kinds, 1941 and 1942

	1941		1942			
	Pounds	Value	Muscovite		Phlogopite	
			Pounds	Value	Pounds	Value
Quebec.....	1,603,575	284,563	9,008	445	2,648,036	284,818
Ontario.....	1,587,316	47,047	35,829	31,698	2,764,798	57,545
British Columbia (*).....	297,000	3,678	562,000	9,061		
Total.....	3,487,891	335,288	606,837	41,204	5,412,834	342,363

(*) Ground mica schist.

The following information has been abstracted from a report on mica prepared by the Bureau of Mines, Ottawa:

"Canada is one of the two main world sources of phlogopite, or amber mica, the other being the island of Madagascar. Muscovite, or white mica, is of fairly common occurrence in Canada, but in general, deposits of this type have proved of small economic importance, owing either to the poor grade of material or to the small amount of mica present, and, until recently, production of muscovite was negligible. The discovery of an important muscovite-bearing field near Mat-tawa, Ontario, in 1941-42 has materially altered this situation and active development is pro-ceeding. Substantial quantities of high-quality mica, much of it recovered in sheets of phe-nomenal dimensions, were taken out in this area in 1942 and the district shows promise of becoming an important producer. Muscovite of "ruby" quality was recently found in Berger-onnes township, Saguenay county, Quebec, from where there was a small production in 1942.

"Most of the production of phlogopite has been derived from a comparatively restricted area in adjacent parts of Ontario and Quebec, in the general Ottawa region, and extending roughly from Kingston, northeastward into Gatineau and Papineau counties, Quebec. In Quebec, the mica-bearing series extends for some distance west and east of the main productive district into Pontiac and Argenteuil counties respectively and there are also several scattered occurrences as far east as Quebec City. In Ontario, similar outlying deposits extend westwardly into Hastings and Haliburton counties. In recent years most of the productive activity has been centred on deposits in Quebec.

"Muscovite and phlogopite sheet mica are used almost entirely for electrical insulation. They are cut or punched into a great variety of shapes and sizes and in the form of splittings are bonded and pressed into large sheets that can be sawn, bored, and machined into any desired article. Some clear mica, mostly muscovite, is used as stove windows and in lighting equipment and there is a limited demand for special large-sized, flawless sheet for use in marine compass dials, boiler gauges, and in the iniconoscopes of television transmitters. Muscovite and phlogo-pite are essential in the manufacture of aviation sparkplugs, the latter for the nose-washers at the base of the plug, which are required to possess high heat-resistance, and the former, in the shape of washers, for the barrel, and as thin sheets (so-called "cigarette mica") for the spindle-wrapping and radio shield. Large quantities of muscovite are used in the form of thin sheets for radio condenser films. For all such uses muscovite must be of the best quality, free from spotting or heavy staining. Spotted and stained muscovite ("electric" mica) is used mainly in domestic heater appliances, such as toasters, and flat-irons, and inferior, ribbed material is punched into washers and discs for various insulating purposes. Because of the restrictions on the manufacture of a wide range of electrical equipment an abundant supply of low-grade musco-vite is available and such material is difficult to market.

"Fine flake or powdered mica made mainly from muscovite, and also from phlogopite and even biotite, has become an important industrial product, particularly in the United States, where a number of plants are engaged in its manufacture by wet and dry systems of grinding. The raw material is variously mine and shop waste or scrap, small sheets and flakes recovered from clay-washing plants, and schist rock mined for the purpose.

"Mica prices in general are difficult to determine owing to the lack of reliable market quotations and to the prevailing system of trade discounts. Quality has such a bearing on value that the only satisfactory method of getting information is to submit samples to an accredited dealer for a quotation. The mica market is subject to pronounced periodic fluctuations in demand owing to prevailing trade conditions and to the practice by consumers of laying in stocks well ahead of current requirements.

"Both phlogopite and muscovite are regarded as 'strategic' war minerals, and have been included among the minerals dealt with in the 'Prospectors' Guide', issued by the Mines and Geology Branch, Department of Mines and Resources, Ottawa, in 1942. Copies of this publication may be obtained by applying to the Director of the Branch."

Table 192.—Consumption of Mica in Canada, by Industries, as Reported to the Annual Census of Industry, 1941 and 1942

	1941		1942	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....	113	168,769	102	180,740
In Rubber Industry.....	155	15,565	112	10,960
In Roofing (a).....	448	25,975	436	25,340
In Mica Manufacturing Industry.....	134	28,845	196	35,151
Total accounted for.....		239,154		252,191

(a) Includes mica used in manufacture of wall paper.

Vermiculite:—Vermiculite, an altered variety of phlogopite or biotite mica, which swells enormously when heated, yielding an exceedingly light-weight and bulky, cork-like material, is now widely utilized in the heat-treated, expanded form as a valuable heat and acoustical insulation product. Most of the world production comes from the United States, and large quantities of the crude mineral are imported into Canada for processing. No authenticated occurrences are known in Canada, though there have been unconfirmed reports of deposits in the Albreda district, British Columbia. The crude material sold in 1941 at \$9.50 to \$12 per ton f.o.b. mines in North Carolina and Montana, respectively, while the expanded product retailed at around \$1 per 24-pound bag of 4 cubic feet at Eastern Canadian points.

Table 193.—Principal Statistics of the Mica Mining Industry in Canada, 1941 and 1942

	1941	1942		
	Canada (*)	Quebec	Ontario	Canada (*)
Number of firms or operators.....	81	84	20	106
Capital employed.....	1,180,097	1,113,707	347,062	1,460,769
Number of employees—On salary.....	16	22	13	55
On wages.....	230	243	83	326
Total.....	246	265	96	361
Salaries and wages—Salaries.....	23,193	20,823	15,322	45,145
Wages.....	158,607	147,862	65,598	213,460
Total.....	181,800	177,685	80,920	258,605
Selling value of products (gross).....	335,288	285,263	89,243	383,567
Cost of fuel and electricity.....	17,705	13,945	4,207	18,152
Cost of process supplies used.....	21,821	16,553	2,608	19,161
Selling value of products (net).....	295,759	254,765	82,428	346,254

(*) Does not include general statistics for one operating mill and one mine in British Columbia for which data are not available.

Table 194.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1941 and 1942

Month	1941			1942			
	Mine	Shop (a)		Mine		Shop (a)	
		Male	Female	Surface	Under-ground	Male	Female
January.....	91	61	7	67	52	85	59
February.....	81	67	6	63	50	89	51
March.....	73	62	24	66	43	87	51
April.....	80	64	22	78	41	81	43
May.....	100	74	38	99	42	78	45
June.....	132	75	50	102	45	80	51
July.....	135	74	50	120	52	95	52
August.....	123	68	45	133	46	100	77
September.....	124	71	38	127	41	94	73
October.....	110	70	33	130	61	74	75
November.....	129	69	29	133	54	74	133
December.....	116	79	35	100	46	71	139

(a) Includes some outside workers.

Table 195.—Capital Employed in the Mica Mining Industry in Canada, by Provinces, 1942

	Quebec	Ontario	Canada†
CAPITAL EMPLOYED AS REPRESENTED BY—			
Present cash value of the land (excluding minerals).....	846,925	196,409	1,043,334
Present value of buildings, fixtures, machinery, tools and other equipment.....	85,490	41,290	126,780
Inventory value of minerals on hand, ore in process, fuel and miscellaneous supplies on hand.....	67,854	13,793	81,647
Inventory value of finished products on hand.....	10,280	57,981	68,261
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)....	103,158	37,589	140,747
Total.....	1,113,707	347,062	1,460,769

† Does not include data for 1 property in British Columbia.

PEAT INDUSTRY

The Canadian peat industry comprises both firms producing peat as a fuel and peat moss and humus for various other purposes. During 1942 only 172 short tons of peat fuel valued at \$1,204 were commercially produced in Canada. This output came from a bog located in Ellice township, Perth county, Ontario. At Terence Bay, Nova Scotia, a few tons of peat were cut in 1942 for experimental purposes by one of the parish priests. No other reports of the mining of peat for use as a fuel were received during the year under review.

The production of peat moss in the Dominion during 1942 showed a remarkable increase over that of the previous year. Commercial shipments totalled 53,506 short tons with a value (less cost of containers) of \$1,069,372 compared with 27,803 short tons worth \$644,253 in 1941. Production of moss in 1942 was reported from bogs located in New Brunswick, Quebec, Ontario, Manitoba, Alberta and British Columbia. Of the total tonnage shipped, 53 per cent originated in British Columbia, 24 per cent in Quebec and 18 per cent in Ontario. Shipments according to use were as follows: 12,071 tons for horticultural purposes; 113 tons as insulation; 17,344 tons as poultry and stable litter; 23,927 tons for metallurgical purposes and 51 tons for other uses. Included in the tonnage of moss sold for horticultural use were 324 tons of humus. Products were marketed in the form of bales, bags, pads and insulation manufactures. The cost of packing material and containers totalled \$237,721. Canadian moss sold for metallurgical purposes was for consumption in the United States in the production of magnesium metal.

The number of firms reported as active in the production of peat moss or the development of peat moss bogs totalled 35 in 1942. Capital was reported at \$3,212,921 and \$1,380,142 were distributed as salaries and wages to 1,316 employees. The net value of production in 1942 was estimated at \$1,031,211.

Table 196.—Principal Statistics of the Peat Industry in Canada, 1941 and 1942

	1941	1942
Number of firms.....	(a)22	(b)35
Number of plants or bogs.....	22	35
Capital employed.....	\$ 825,154	3,212,921
Number of employees—On salary.....	37	69
On wages.....	630	1,247
Total.....	667	1,316
Salaries and wages—Salaries.....	\$ 65,988	113,781
Wages.....	\$ 420,128	1,266,361
Total.....	\$ 486,116	1,380,142
Selling value of products (gross).....	\$ 646,408	1,308,297
Cost of fuel and electricity.....	\$ 17,327	25,866
Process supplies used.....	\$ 145	13,499
Cost of containers or packing material.....	\$	237,721
Selling value of products (net).....	\$ 628,936	1,031,211

(a) Includes two producing fuel.

(b) Includes one producing fuel.

Table 197.—Capital Employed in the Peat Industry in Canada, by Provinces, 1942

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
Quebec.....	\$ 76,200	\$ 211,320	\$ 78,287	\$ 27,654	\$ 25,731	\$ 419,192
Ontario.....	32,900	110,145	59,305	4,500	16,129	222,979
Manitoba (*).....	5,000	63,047	50,557	4,404	5,100	128,108
British Columbia.....	74,066	550,642	643,135	14,402	1,160,397	2,442,642
Canada.....	188,166	935,154	831,284	50,960	1,207,357	3,212,921

* Includes data for one firm in New Brunswick and one in Alberta.

Table 198.—Wage-Earners, by Months, 1942

Month	Bog		Dressing plant	
	Male	Female	Male	Female
January.....	571	1	189	.....
February.....	697	1	164	.....
March.....	747	1	102	.....
April.....	758	10	113	.....
May.....	846	43	143	6
June.....	1,169	80	146	10
July.....	2,069	554	147	5
August.....	1,744	415	132	6
September.....	937	68	184	23
October.....	817	39	229	25
November.....	645	11	273	21
December.....	498	3	252	31

Table 199.—Peat Fuel Produced in Canada, 1928-1942 (tons of 2,000 pounds)

Year	Tons	\$
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761
1936.....	1,341	7,376
1937.....	478	2,676
1938.....	620	3,500
1939.....	445	2,445
1940.....	30	75
1941.....	355	2,155
1942.....	172	1,204

NOTE:—For information of a technical nature, please refer to report No. 614 "Facts About Peat" issued by the Bureau of Mines, Ottawa.

Table 200.—Production (Shipments) of Peat Fuel and Peat Moss in Canada, by Uses and by Provinces, 1942

Province	Fuel		Moss									
	Tons	\$	Horticulture		Insulation		Poultry and stable litter		Metallurgy		Other uses	
			Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
Quebec.....			4,410	74,332	81	2,104	8,491	121,124				12,932
Ontario.....	172	1,204	5,832	89,058	1	46	3,594	58,625				9,427
Manitoba, New Brunswick and Alberta.....			541	8,358	31	542	2,005	56,412				2,577
British Columbia.....			1,288	28,318			3,254	77,302	23,927	549,774	51	3,377
Total.....	172	1,204	12,071	200,066	113	2,692	17,344	313,463	23,927	549,774	51	3,377
												53,506
												1,069,372

(*) Less cost of containers.

The following abstracts are from a report prepared by H. A. Leverin of the Bureau of Mines, Ottawa—Memorandum series 83—February, 1943:

"Peat occurs in nature in two distinct forms, unhumified and humified, differing markedly in physical properties and chemical composition. Unhumified peat is the dead moss of sphagnum mosses, only slightly humified; it is fibrous, elastic, of light greyish green, yellowish to light brown colour, becoming, on drying, somewhat darker. It has an absorptive value of 10 to 26 times its own weight, is light in weight and is porous. Humified peat in its natural state is dark brown to black, colloidal, plastic, homogeneous and somewhat elastic. It dries into a hard solid mass of a specific gravity higher than water. It has almost no absorptive value. Unhumified peat left in its natural state will humify in course of time and all fibrous matter eventually disappears. Humified peat in the trade is usually named 'fuel peat' and unhumified or slightly humified peat 'peat moss'. The latter nomenclature may be considered correct in regard to unhumified Canadian peat products, because most of them are derived from sphagnum mosses, but there are many large deposits in Canada and in the United States that originated from carex (consists mainly of the residues of straws, leaves and roots of the tall-stemmed sedges of the carex group) and other sedges, reed, hypnum and a mixture of aquatic plants and these should not be sold under the name of peat moss; these are of much lower quality than the sphagnum mosses. The name peat moss, however, has become the established trade name for unhumified and slightly humified peats. Sphagnum moss, sometimes termed 'white moss' or genuine peat moss is by far the best raw material and yields the best grade of commercial peat moss.

"Sphagnum peat moss seldom occurs in deposits in a pure state but is generally intermixed with the residues of Eriophorum (cotton grass), sedges, hypnum mosses, Andromeda Glaucophylla (bog rosemary), Ledum decumbens (labrador tea), Vaccinium oxycoccus (cranberry), Empetrum nigrum (crowberry), Sarracenia purpurea (pitcher plant), etc., etc.

"Canada possesses an abundance of sphagnum moss in every province and as it fetches the best price and costs no more to produce than the inferior grades of unhumified peat it should be possible to maintain the high quality of Canadian peat moss on the export market.

"In the peat moss trade some confusion exists in regard to the quality of the products, no standard having been so far generally adopted in regard to the name of the products, the physical and chemical standards of the peat, and the size and weight of the packages. In Canada and the United States the word peat moss is generally used, whether the product is derived from moss, sedge, reed or other aquatic plants. Bales and packages are of many sizes, in Europe ranging from 130 to 220 pounds and in Canada they range from 75 to 130 pounds, and many other sizes of smaller packages are in use according to the requirements of the trade.

"Of great importance to the peat moss industry is the fact that the United States Treasury Department, through its Procurement Division, Washington, D.C., has adopted standards for the distinct grades of peat recognized commercially, and has issued specifications to cover their purchases by the Federal Government. Peat should be furnished in the following types and classes, as specified in the invitation bids:

Type I. Moss peat (*).

Class A.—Horticultural grades (fine shreds).

Class B.—Poultry litter (medium shreds).

Class C.—Stable bedding (coarse shreds).

Type II. Reed or sedge muck.

Type III. Reed peat or sedge peat.

Class A.—Acid grade.

Class B.—Nearly neutral grade.

(*) Moss peat shall be the poorly decomposed (fibrous or cellular) stems and leaves of any of the several species of sphagnum mosses. The PH value shall be not less than 3.5 and not greater than 5.5. Peat shall be furnished in air-dry condition and shall contain not more than 35 per cent moisture by weight. Water holding capacity shall be not less than 1100 per cent by weight, on an oven-dry basis."

THE SALT INDUSTRY

Production of common salt or sodium chloride in Canada during 1942 totalled 653,672 net tons valued at \$3,844,187, compared with 560,845 net tons worth \$3,196,165 in 1941. The quantity and value of the output during the year under review were the highest ever realized by the Canadian salt industry. The mineral in 1942 was produced in Nova Scotia, Ontario, Manitoba and Alberta, and of the total production, Ontario contributed 558,407 net tons or 85.4 per cent. Statistics of production represent the recovery of salt from brine wells with the exception of Nova Scotia, where the output comes entirely from the underground mining of rock salt deposits.

Of the total salt produced in 1942, there were 327,548 net tons or 50.1 per cent consumed by the producers themselves in the manufacture of caustic soda and other chemicals. Producers' sales of salt in 1942 included 87,743 net tons of table and dairy grades; 150,008 net tons of common fine, and 35,271 net tons of common coarse. The balance of Canadian shipments in 1942 consisted of various other varieties, including salt for agriculture and for highway maintenance. A report issued by the Bureau of Mines, Ottawa, states that definite zones in which indications of potash salts occur have been correlated from the second to the twenty-sixth level of the Malagash mine in Nova Scotia, and there appears to be an increase in the potash content in depth. The study of these zones is being continued. Detailed studies have also been started with a view to improving the grade of fishing salt obtained from this deposit, and encouraging results are being obtained. No salt deposits in the United States are known to be nearer than about 200 miles from the Atlantic coast, and some industries along the coast, such as fish curing, have usually found it easier to use salt imported chiefly from the West Indies. The submarine menace during the early part of the present war made it increasingly difficult to obtain salt from this source and these consumers were largely obliged to obtain their supplies from within the United States and Canada.

The number of Canadian firms reporting primary salt production in 1942 totalled 9; capital employed by the industry amounted to \$5,687,511, of which \$3,500,950 represented the value of buildings, machinery, etc., and \$278,495 the value of land. Employees numbered 675, including 80 females. Salaries and wages totalled \$1,114,574; \$536,649 were expended for fuel and electricity and \$133,783 for chemicals and other process supplies.

The "apparent" consumption of salt in Canada in 1942 is estimated at 718,470 net tons valued at \$4,151,247 compared with 629,754 net tons worth \$3,524,285 in 1941.

Statistics relating to Canadian salt production are available only since 1886 and salt output in the Dominion since that year to the end of 1942 totalled 10,093,218 net tons valued at \$57,914,461. Statistics relating to world production of salt have not been available since 1938.

Caustic soda, chlorine and hydrochloric acid are now manufactured by Canadian Industries Limited from salt obtained from the Company's wells located at Sandwich. This Company operates chemical plants at Windsor, Cornwall, Shawinigan Falls and Quebec.

The Brunner, Mond Canada, Limited, located at Amherstburg, Ontario, manufactures soda ash from natural brine; calcium chloride is also recovered as a by-product by this company.

Table 201.—Production of Salt in Canada, by Grades, 1941 and 1942

	1941			1942		
	Manu- factured	Sold	Value of salt sold (Not including containers)	Manu- factured	Sold	Value of salt sold (Not including containers)
	tons	tons	\$	tons	tons	\$
Table, dairy and pressed blocks.....	79,683	78,901	1,372,409	89,588	87,743	1,698,210
Common, fine.....	133,103	131,001	733,072	147,168	150,008	890,906
Common, coarse.....	36,807	35,838	360,772	33,794	35,271	330,322
Highway salt.....	7,069	7,069	36,986	996	996	5,438
Land salt.....	626	641	4,254	514	509	3,493
Other grades.....	47,208	48,684	258,019	52,239	51,597	335,037
Brine for chemical works (salt equivalent sold or used).....	258,711	258,711	430,653	327,548	327,548	580,781
Total.....	563,207	560,845	3,196,165	651,847	653,672	3,844,187
Value of containers.....			656,334			748,816
Grand Total.....	563,207	560,845	3,852,499			4,593,003

Table 202.—Salt Produced for Chemical Purposes*, 1928-1942

Year	Quantity Tons (2,000 lb.)	Per cent of total salt output	Year	Quantity Tons (2,000 lb.)	Per cent of total salt output
1928.....	135,138	45	1936.....	165,882	42
1929.....	168,327	51	1937.....	205,149	45
1930.....	114,737	42	1938.....	170,938	39
1931.....	97,958	38	1939.....	167,958	44
1932.....	96,242	37	1940.....	224,009	43
1933.....	104,740	37	1941.....	258,711	46
1934.....	124,132	39	1942.....	327,548	50
1935.....	145,433	40			

(*) Used in the manufacture of chemicals by producers of salt.

Table 203.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1941 and 1942*

Industry	1941		1942	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	44,229,400	363,201	44,918,800	460,162
Slaughtering and meat packing.....	102,888,000	702,348	112,575,017	775,059
Acids, alkalies and salts—Brine (salt content) and dry salt.....	495,346,445	708,321	613,076,907	886,119
Soaps and cleaning preparations.....	5,823,762	24,311	4,363,370	22,822
Dyeing, cleaning and laundry work.....	5,018,198	49,389	6,286,284	56,970
Dyeing and finishing of textiles.....	3,379,482	19,898	5,564,143	25,709
Artificial ice.....	428,411	3,550	474,440	3,720
Abrasives—artificial.....	826,000	4,280	784,000	4,172
Waterworks.....	1,000,000	(†)	3,596,200	(†)
Leather tanneries.....	16,212,371	84,365	16,412,227	85,305
Pulp and paper mills.....	28,772,000	118,015	28,606,000	132,161
Stock and poultry foods.....	6,258,000	46,353	8,158,000	63,376
Bread and other bakery products.....	14,444,719	170,892	15,481,319	183,393
Fruit and vegetable preparations.....	14,476,063	102,009	13,212,011	98,254
Biscuits, confectionery, etc.....	1,609,456	17,685	1,894,910	18,615
Foods, breakfast.....	1,290,819	10,211	1,386,367	10,976
Sausage and sausage casings.....	766,466	7,996	637,966	7,054
Ice cream industry.....	414,880	2,749	458,925	2,203
Breweries.....	721,984	7,530	1,055,986	8,977
Malt and malt products.....	222,150	1,236	220,500	1,278
Macaroni, vermicelli, etc.....	74,259	817	115,602	1,213
Ice cream cones.....	6,006	195	6,394	66
Foods, miscellaneous, including coffee, tea, etc.....	2,603,422	26,614	2,693,050	27,063
Butter and cheese.....		214,659		240,607
Starch and glucose.....	492,467	2,302	623,360	2,625
Animal oils and fats.....	270,000	1,200	364,000	1,850
Condensed milk.....		512		409
Cheese, processed.....	148,534	2,283	239,263	4,573

(*) In addition, large quantities of salt are used on highways.

(†) Value not compiled.

Table 204.—Principal Statistics of the Salt Industry in Canada, 1940-1942

	1940	1941	1942
Number of firms (*).....	9	9	9
Capital employed..... \$	4,993,914	5,559,307	5,687,511
Number of employees—On salary.....	120	148	134
On wages.....	466	520	541
Total.....	586	668	675
Salaries and wages—Salaries..... \$	299,521	361,661	337,050
Wages..... \$	536,985	656,991	777,524
Total..... \$	836,506	1,018,652	1,114,574
Selling value of products (gross)..... \$	3,322,250	3,852,499	4,593,003
Cost of purchased process materials..... \$	40,198	69,341	153,783
Cost of fuel and electricity..... \$	321,589	450,291	536,649
Value of containers..... \$	498,981	656,334	748,816
Net value of sales..... \$	2,461,482	2,676,533	3,173,755

(*) 6 in Ontario; 1 in Nova Scotia; 1 in Manitoba; 1 in Alberta.

Table 205.—Capital Employed in the Salt Industry in Canada, 1942

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land (excluding minerals).....	278,495
Present value of buildings, fixtures, machinery, tools and other equipment.....	3,500,950
Inventory value of materials on hand, salt in process, fuel and miscellaneous supplies on hand.....	501,470
Inventory value of finished products on hand.....	102,082
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,304,514
Total.....	5,687,511

Table 206.—Wage-Earners, by Months, 1939-1942 (On last day of each month or nearest work day)

Month	1939	1940	1941	1942		
				Male		Female
				Surface	Under-ground	Surface
January.....	440	431	428	447	43	25
February.....	426	439	435	449	50	27
March.....	407	442	449	442	46	28
April.....	424	463	484	448	48	26
May.....	439	490	516	462	49	28
June.....	459	477	543	473	57	30
July.....	460	493	558	482	52	31
August.....	416	503	564	464	52	32
September.....	431	490	565	458	53	37
October.....	458	483	574	454	52	36
November.....	449	492	563	472	52	45
December.....	408	396	556	456	50	39
Average.....	434	466	520	459	50	32

POTASH

Natural potash salts are not yet mined or recovered on a commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland County, Nova Scotia, and at Gautreau, Westmorland County, New Brunswick. Potassium chloride occurs at Malagash in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite.

Complete statistics relating to world production of potash are not available for 1941 or 1942 as publication of potash statistics by European governments virtually ceased in the summer of 1939, and no adequate data are available since.

Table 207.—Potash Salts Used in the Manufacture of Canadian Mixed Fertilizers, 1941 and 1942

	1941		1942	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Nitrate of potash.....	4	566	90	876
Kainite and potash manure salts.....	3,280	59,232	30,182	587,489
Muriate of potash.....	42,815	1,540,783	41,648	1,686,724
Sulphate of potash.....	2,988	134,839	4,525	196,754

Table 208.—Sales of Potash Salts for Fertilizer Purposes, other than for the Manufacture of Mixed Fertilizers, Years Ended June 30, 1941 and 1942

	1941	1942
	(short tons)	
Muriate of potash.....	7,425	5,419
Sulphate of potash.....	132	122

TALC AND SOAPSTONE INDUSTRY

The value of crude and refined talc and soapstone sold by Canadian producers of these minerals in 1942 totalled \$310,824 compared with a corresponding value of \$360,809 in 1941. Mine shipments of soapstone in 1942 totalling 14,369 tons and valued at \$136,529 came entirely from the Eastern Townships in the province of Quebec. Production of high grade talc is confined chiefly to the province of Ontario, and in 1942 shipments totalling 15,499 net tons valued at \$174,295 were made from properties located near Madoc, Hastings county, and from a deposit situated in Canonto township in Frontenac county. In British Columbia, crude talc imported from the United States was treated in a mill operated by Geo. W. Richmond & Company of Vancouver.

During 1942 there were 10 firms reported as active in the industry, 7 in the province of Quebec and 3 in Ontario; all of these made commercial mine shipments. Capital employed in the industry totalled \$567,665; employees numbered 115 and \$113,601 were distributed as salaries and wages. Fuel and purchased electricity consumed were appraised at \$25,905 and the cost of explosives and other process supplies used was reported at \$33,208. The net value of sales in 1942 was estimated at \$251,711 compared with \$305,603 in 1941.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"The entire talc and soapstone production of Canada has for some years past come from Ontario and Quebec. More than 90 per cent of the total output of talc to the end of 1942, however, came from the Madoc area, Hastings county, Ontario, which supplies ground talc of good white colour, while Quebec produces mainly a grey, off-colour grade. Quebec is the only producer of cut soapstone blocks and bricks, and of sawed crayons.

"Development of the Madoc deposits commenced about 1900 and total output to date is estimated to have been about 400,000 tons. Since 1937, Canada Talc Limited, operating the Conley mine, has furnished most of the supply, having taken over the mine and mill of the G. H. Gillespie Company, the pioneer operator, in that year. Production is at the rate of about 15,000 tons a year. There have been various other small, intermittent operations in the area but these have accounted for only a small tonnage. In 1941, Trent Mining Syndicate commenced development on a property adjoining the Conley mine and erected a small mill, but was inactive during most of 1942. W. C. Spry (Victory Talc) continued to grind a small tonnage of off-colour talc in the mill of Canada Slate Products about a mile north of Madoc, the crude rock being obtained from a deposit near Ompah, Frontenac county, 65 miles distant. The Ompah talc is finely schistose, cream-coloured, and quite distinct in character from that of the Madoc district.

"Quebec has been producing cut soapstone since 1922, mainly in the form of blocks and bricks for the alkali recovery furnaces of domestic kraft mills. The sawing of crayons was commenced a few years ago. The industry is centred in the Thetford Mines district, Eastern Townships, where Broughton Soapstone and Quarry Company is the principal operator. This company operates two soapstone quarries near Leeds station in Broughton township and in addition to turning out cut stone and crayons produces most of the ground talc made in the province. Other smaller operators in the same district are Charles Fortin, of Robertson, and L. C. Pharo, of Thetford Mines, working in Thetford and Leeds townships, respectively. Some of the sawing dust from these operations is sold to domestic roofing firms and a considerable tonnage of quarry and sawing waste is shipped to the grinding plant of Pulverized Products, Limited, 4820 Fourt Avenue, Rosemount, Montreal. Total sales of cut stone from the district in 1942 were about 3,000 tons and of ground talc about 8,500 tons. Baker Mining and Milling Company, 4010 St. Catherine Street West, Montreal, the only other operator in Quebec, has a mine and mill near Highwater in Brome county, close to the Vermont boundary. The company began to produce in 1938 and in 1941 reported sales of about 1,500 tons of ground talc of various grades. Total production of ground talc in the Province in 1942 was nearly 14,000 tons.

"In British Columbia the deposits near McGillivray, on the Pacific Great Eastern railway and at Kapoor near Victoria have been idle since 1935.

"Many grades of ground talc are marketed and the price range is wide. Value is dependent upon purity (governing freedom from lime and gritty or iron-bearing substances, slip, and colour), particle shape, and fineness of grinding, the specifications for which vary in the different consuming industries. Roofing and foundry tales are the cheapest grades, these trades being satisfied with coarser grey or off-colour material, often soapstone powder or sawing dust, which sells at about \$5 to \$7 a ton f.o.b. rail. Domestic grey talc, suitable for rubber and paper use, sold in 1942 for an average of \$7 to \$8 per ton. White, Madoc talc was quoted at \$7 to \$10 for the coarser grades, \$11 to \$28 for finer mesh sizes, and \$44 for minus 400-mesh material.

"**Pyrophyllite.**—Pyrophyllite (hydrous silicate of alumina) closely resembles talc in appearance and physical characteristics. It is difficult to distinguish from talc even by microscopic means and often requires chemical analysis for its identification. In the ground state it can be employed for many of the industrial uses of talc. Commercial deposits are relatively scarce. Most of the recorded world production comes from North Carolina where the industry has expanded rapidly in recent years. A large part of the American output goes to the ceramic trade, the remainder being sold for fillers in various products. When fired, pyrophyllite does not flux, as does talc, and it is of value in a wide range of high-grade ceramic products, including refractories.

"Important deposits are known in Newfoundland, from which some shipments were made a few years ago to the grinding mill of Clinchfield Sand and Feldspar Corporation, Baltimore, Maryland. The occurrences are at present owned and operated by Industrial Minerals Company of Newfoundland Limited, Box 435, St. John's, which in 1942 installed a grinding plant with a capacity of 25 tons a day and shipped about 500 tons of ground material to Great Britain. In Canada, some rather low-grade, sericitic pyrophyllite occurs at Kyuquot Sound on the west coast of Vancouver Island. A small quantity was shipped from these deposits about 30 years ago for use in refractories and cleanser products. None of the reported occurrences of pyrophyllite in Quebec have been developed and little is known of their extent or economic possibilities. One such deposit in Stanstead township, near Lake Memphremagog, was investigated in 1941 by the Bureau of Mines, but the material proved to be sericite.

"In 1942, pyrophyllite was quoted at \$8 to \$13 a ton, f.o.b. North Carolina mills, for 200-mesh and 325-mesh material, respectively."

Table 209.—Production (Sales) in Canada of Talc and Soapstone, 1940-1942

	1940		1941		1942	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$	Tons	\$
Soapstone (Quebec) (*)	8,625	74,905	16,461	155,925	14,369	136,529
Talc—Ontario	15,166	154,734	18,171	204,884	15,499	174,295
Total Canada	23,791	229,639	34,632	360,809	29,868	310,824

(*) Shipments by some firms usually include a considerable quantity of material classified as talc.

Table 210.—Consumption of Talc in Canada, by Industries, as Reported in the Annual Census of Manufactures, 1942 and 1941

Industry	1941		1942	
	Short tons	Cost at works	Short tons	Cost at works
		\$		\$
Rubber industry.....	1,093	21,194	1,409	27,459
Electrical apparatus.....	438	10,906	354	9,776
Paints.....	3,789	130,215	5,428	154,814
Soaps and cleansing preparations.....	793	21,244	602	13,640
Toilet preparations.....	562	27,377	513	22,015
Polishes.....	19	478	18	397
Products from imported clays.....	762	11,542	565	7,774
Prepared roofing.....	4,740	49,750	4,166	47,928
Pulp and paper (talc and agalite).....	1,169	19,023	1,812	31,378

Table 211.—Principal Statistics of the Talc and Soapstone Industry in Canada, 1940-1942

	1940	1941	1942
Number of firms.....	8(b)	8(c)	10(a)
Capital employed..... \$	319,398	695,551	567,665
Number of employees—On salary.....	7	8	8
On wages.....	87	140	107
Total.....	94	148	115
Salaries and wages—Salaries..... \$	19,563	21,564	22,729
Wages..... \$	61,316	107,256	90,872
Total..... \$	80,879	128,820	113,601
Selling value of products (Gross)..... \$	229,639	360,809	310,824
Cost of fuel and purchased electricity..... \$	15,480	26,882	25,905
Cost of explosives and other process supplies..... \$	21,650	28,324	33,208
Selling value of products (net)..... \$	192,509	305,603	251,711

(a) 7 firms in Quebec and 3 in Ontario; data for 1 firm in Quebec, other than sales, not available.

(b) 6 firms in Quebec and 2 in Ontario.

(c) 5 firms in Quebec and 3 in Ontario.

Table 212.—Capital Employed, by Classes*, 1940-1942

	1940	1941	1942
	\$	\$	\$
Present value of land, buildings, fixtures, machinery, tools and other equipment.....	284,093	590,303	458,036
Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	5,184	18,343	9,465
Inventory value of finished products on hand.....	6,518	8,915	21,385
Operating capital.....	22,703	78,020	78,779
Total.....	319,398	695,551	567,665

(*) By active firms.

Table 213.—Wage-Earners, by Months, 1941 and 1942

Month	Total 1941	1942		
		Surface	Under-ground	Mill
January.....	99	55	57	29
February.....	108	63	56	26
March.....	100	46	58	25
April.....	121	43	49	25
May.....	131	43	45	22
June.....	150	46	45	26
July.....	149	53	34	23
August.....	161	47	25	21
September.....	153	35	27	23
October.....	173	33	25	24
November.....	169	34	25	22
December.....	167	41	15	20

MISCELLANEOUS INDUSTRIAL OR NON-METAL MINING INDUSTRIES

Included in this section are the following non-metallic minerals and mineral products:—

Barite	Graphite	Phosphate
Brucite	Grindstones	Silica Brick
Corundum	Kyanite	Sodium Carbonate
Diamonds	Lithium Minerals	Sodium Sulphate
Diatomite	Magnesitic Dolomite	Strontium Minerals
Fluorspar	Magnesium Sulphate	Sulphur (Pyrites)
Garnet	Natural Mineral Waters	

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products produced (or deposits developed) by this industry during 1942 included: barite, brucite, diatomite, fluorspar, graphite, grindstones, lithium minerals, magnesitic dolomite (crude and refined), mineral waters, phosphate, silica brick, sodium carbonate and sodium sulphate. For convenience, the sulphur content of pyrites shipped and sulphur recovered from smelter gas, are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries.

The number of firms reported as active in the industry during 1942 was 61; capital employed totalled \$4,919,871; employees numbered 811 and salaries and wages paid amounted to \$1,142,072. The cost of fuel, purchased electricity and process supplies used during the year was reported at \$952,860 and the gross value of production totalled \$3,006,167 compared with \$3,089,156 in 1941.

BARITE

Production (mine shipments) of barite in Canada during 1942 totalled 19,667 short tons valued at \$188,144 compared with 6,890 short tons worth \$74,416 in 1941. Production in 1942 represented shipments made by Canadian Industrial Minerals Limited from deposits located near Walton, Hants county, Nova Scotia, and by the Summit Lime Works Limited from deposits situated near Parson in the Golden mining division of British Columbia. In the province of Quebec, some development work was conducted in 1942 on a barite deposit by Mr. A. Lambert of Lac aux Sables, Portneuf county; no commercial shipments were reported. Included in the shipments made in 1942 by the Summit Lime Works Limited was a relatively small tonnage of high-grade barite obtained from a deposit 30 miles south of Elko on the Crow's Nest branch of the Canadian Pacific Railway.

"Barite in 1942", issued by the Bureau of Mines, Ottawa, states:

"Canada's largest known reserves of barite are situated in Nova Scotia, which has produced most of the recorded output. Total production of the Dominion from 1885 to the end of 1942 amounted to 68,245 tons valued at \$571,628.

"In addition to the Nova Scotia occurrences, deposits are known in Ontario, Quebec, and British Columbia. Various attempts have been made over a period of years to develop a barite industry in Ontario, but with little success. Prior to 1941, little attention had been paid to occurrences in British Columbia, but a small tonnage was produced in that year and shipments increased considerably in 1942.

"The most important development in the history of the industry was the discovery in 1940 of a very large deposit near Walton, Hants county, Nova Scotia. Drilling has indicated reserves of 1½ million tons of ore to a depth of 200 feet. The occurrence is being actively developed by Canadian Industrial Minerals Limited, a subsidiary of Springer-Sturgeon Gold Mines Limited, 67 Yonge Street, Toronto, which has installed a mill at tide-water, 2½ miles distant and is turning out a 325-mesh product designed primarily for use in oil drilling for which a ready market exists in Trinidad and South America. Shipments of crude are also being made both for United States and domestic use in the manufacture of lithopone and barium chemicals. The Walton barite is mostly off-colour material, of a strong reddish shade and thus is not suitable for the general pigment and filler trade without bleaching. It is, however, high in barium sulphate, with a specific gravity of 4.25 or over, and is well adapted to oil drilling use. Shipments from this source totalled nearly 7,000 tons in 1941 and in 1942 rose to over 17,000 tons.

"No critical situation in respect to barite has developed as a result of war needs and ample reserves are available for Allied use. The United States has stepped up production to care for increased demands for defence purposes, mainly to replace imports for the manufacture of barium chemicals and for use in rubber and camouflage paints. Certain barium salts, chiefly the nitrate and peroxide, are used extensively in military pyrotechnics, and in the primer mixtures of incendiary bombs.

"Canadian consumption of barite, estimated from import figures and sales of domestic material, is under 5,000 tons a year.

"Barite is a relatively low-priced commodity. Canadian quotations have been \$7 to \$10 per ton for good white crude, f.o.b. mines, depending on rail-haul; \$40 to \$44 for domestic ground material; and \$50 for prime white imported ground.

"Barite enters Canada free under the British preferential tariff; imports from other countries pay 25 per cent ad valorem. The United States imposes a duty of \$4 per ton on crude barite and \$7.50 per ton on ground or otherwise manufactured material.

"Prior to the war, world production of barite approximated one million tons a year, with Germany furnishing 50 per cent and the United States 30 per cent of the total. The remainder was obtained mainly from the United Kingdom, Italy, Greece, France and India, Cuba has recently become a potentially important source of the mineral."

Table 214.—Barite and Blanc Fixe Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1938-1942

Year	Barite		Blanc Fixe (*)	
	Pounds	\$	Pounds	\$
1938.....	2,729,212	46,288	116,545	3,287
1939.....	2,884,985	49,659	139,408	4,455
1940.....	3,281,747	71,492	99,422	3,873
1941.....	4,906,829	112,760	169,583	8,010
1942.....	6,833,584	150,927	104,948	5,328

(*) Artificial barium sulphate.

CORUNDUM

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the province of Ontario. Corundum mining as an industry made its appearance there in 1900 and production reached a maximum in 1906. Shipments of the mineral in Canada during the period 1900-1921 totalled 19,524 short tons valued at \$2,104,251. No commercial shipments have been reported since 1921; however, a relatively few tons of old corundum-bearing tailings from the Craigmont area in Renfrew county, Ontario, were shipped in 1942 to the Bureau of Mines, Ottawa, for experimental purposes. Official United States quotations for corundum were not available for 1942. Emery was quoted June, 1943, per ton f.o.b. New York, domestic crude ore, first grade, \$10; other American ore, delivered to grinders, per ton, \$16 Pennsylvania, in 350 pound kegs.

In April, 1943 the United States War Production Board reported that there was an insufficient supply of corundum in the United States.

DIAMONDS

Diamonds are not mined in Canada and Canadian consumption is derived entirely from imports. The Mining Journal, London, reviewed the diamond industry in 1942 as follows:

"During 1942 the diamond trade enjoyed marked prosperity. This was, in part, due to the demand for industrial diamonds required for war consumption needs, but, quite apart from this, substantial sales of gem diamonds have been made. While the demand for industrial diamonds at the moment is primarily concerned with war needs, there has been a noticeable increase in the variety of usages to which the diamond is now being adapted in the industrial field, and it is confidently anticipated that, after the war, the industrial diamond will maintain its place in engineering. In 1941 sales of the Diamond Trading Company, which handles the bulk of the world's diamond trade, totalled £7,500,000 of which industrial diamonds accounted for approximately £2,000,000. The relative figures for 1942 are £6,250,000 and £4,250,000. The diamond mines in the Union of South Africa were closed in 1942, their plant, etc., having been made available for war purposes".

World production of diamonds in 1938 totalled 11,455,000 metric carats valued at £7,680,000; of these totals, the Union of South Africa produced 1,238,608 metric carats valued at £3,496,243 and the Belgian Congo 7,205,921 carats worth £860,000. Other important diamond producing countries are the Gold Coast, Sierra Leone, Angola, Brazil and South West Africa.

Diamonds purchased in 1942 by Canadian contract diamond drillers, and including ready and castset bits, totalled \$634,233.

DIATOMITE

Production of diatomite in Canada during 1942 totalled 365 short tons valued at \$9,088 compared with 344 short tons worth \$9,935 in 1941.

A report on diatomite in 1942, prepared by the Bureau of Mines, Ottawa, states:

"Diatomite consists of the microscopically small remains of siliceous shells of diatoms, a form of algae that at one time lived under water. The material of Recent fresh water origin, which is the most common in Canada, usually occurs as a grey or brown mud or peat, whereas the Tertiary diatomite is in more or less dry and compact beds, very light in weight and white to cream in colour.

"For many years International Diatomite Limited, Tatamagouche, Nova Scotia, has been the principal producer, but operations in the ponds near New Annan ceased in the fall of 1940. The principal producers in 1942 were G. Wightman, from a deposit on Digby Neck, Nova Scotia; and to a lesser extent R. L. Marsh for L. T. Fairey of Vancouver, from lot 1122 on west bank of Fraser River north of Quesnel in the Cariboo district of British Columbia.

"Northern Diatomite Company of Toronto started the erection of a treatment plant on its deposit south of Gravenhurst in the Muskoka district and production is expected by the summer of 1943. A little prospecting was done on a few other deposits, but production from any of them is doubtful.

"Normally 75 to 80 per cent of the diatomite consumed in Canada is in the form of filter-aids used mainly in the refining of cane sugar, but in 1942 only about 65 per cent was so used; 22 per cent was used for insulation; and the remainder, principally as a filler, and to a small extent in chemicals, silver polish bases, and as an admixture in concrete.

"Deposits containing medium quality diatomite are very common in some parts of Canada. Owing, however, to United States competition and to the present comparatively small Canadian demand, only properly prepared diatomite of the highest quality can be successfully marketed on a scale sufficiently large to warrant the operation of a property and the erection of a plant.

"Prior to the war diatomite was produced by about thirty countries, but outside the North American continent statistics for the past four years are not available. The United States is by far the world's largest producer and is followed in order by Denmark, Germany, Japan, Algeria, and Northern Ireland. The United States output, which is of very high quality, was about 145,000 short tons in 1942.

"The present price of Canadian diatomite for insulation varies from \$17 to \$30 and imported from \$26 to \$75 per ton for insulation, and filtration; up to \$200 in small lots for material suitable for polishes; imported insulation bricks vary from \$85 to \$140 per 1,000, according to grade and density."

Table 215.—Consumption of Infusorial Earth by the Canadian Sugar Refining Industry, 1933-1942

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1933.....	2,507,460	70,191	1938.....	4,908,597	101,473
1934.....	2,562,552	69,116	1939.....	4,819,811	105,711
1935.....	4,307,142	96,560	1940.....	4,984,362	112,360
1936.....	4,375,999	98,954	1941.....	5,343,131	138,973
1937.....	4,586,786	95,532	1942.....	3,007,180	75,295

FLUORSPAR

Canadian production (mine shipments) of fluorspar during 1942 totalled 6,199 short tons valued at \$146,039 compared with 5,534 short tons worth \$97,767 in 1941. Of the 1942 output, 300 tons came from deposits located at Trout River, Inverness county, Nova Scotia; 4,322 tons from the Madoc area, Hastings county, Ontario; 18 tons from Cardiff township, Haliburton county, Ontario, and the balance from the stock pile of the Rock Candy mine near Grand Forks, British Columbia. The Rock Candy mine is owned by the Consolidated Mining and Smelting Company of Canada Limited but was not operated in 1942.

"Operations were started by Moira Fluorspar Mining Syndicate on the Noyes property, Hastings county, Ontario, in 1939 and a mill was built to beneficiate the ore, which, as in most of the other Madoc deposits, contains considerable calcite and varite. Some fluorspar was produced, but the venture was not a success and in 1940 the company transferred its operations to the nearby Perry mine. Work was suspended, however, before the mine came into production. In 1941, work was resumed on the Noyes mine by Gilman Exploration, Ltd., of Montreal, which continued operations through 1942 and produced most of the spar shipped from the district. In 1940, the Wallbridge mine was taken over by Dominion Fluorspar Company (Halliwell Gold Mines Limited), of Montreal, which built a plant, did some diamond-drilling, and by the end of 1941, when operations were suspended, had shipped several thousand tons. In 1940, Reliance Fluorspar Mining Syndicate, of Toronto, commenced operations on the Howard, or Hill, property, adjoining the Noyes mine and continued work until September 1941 when it transferred its plant to the Perry mine, which it continued to operate through 1942. Charles Stoklosar of Madoc, who prior to the war had produced most of the small tonnage shipped from the district, re-opened the old Blakely mine in 1942 and shipped a few hundred tons. Late in the year plans were announced for re-opening the old Keene mine. Most of the above developments in 1942 were undertaken with financial and other assistance by the Dominion Government, which has also set prices for the various grades produced.

"The ores of the Madoc district, Ontario, and of the Lake Ainslie area, Nova Scotia, are intimate mixtures of fluorspar, calcite, and barite, and have proved difficult to concentrate without excessive loss of fluorspar in the middlings and tailings. In practice, run-of-mine Madoc ore is screened to remove fines, which constitute the bulk of the shipping product and these are sweetened with clean lump spar recovered by passing the coarse material over picking belts. Grade of product does not average much above 60 to 65 per cent CaF_2 . Although this is considerably below the standard trade specification of 85 per cent for metallurgical fluorspar it is accepted by the steel trade under price penalty, provided the barite content does not exceed 12 per cent. Barite is objectionable on account of its sulphur content.

"Deposits of fluorspar also occur in Ontario in Cardiff township, Haliburton county, where a few tons of high-grade picked spar was produced at the Clark property in 1942.

"The Rock Candy fluorspar mine in British Columbia was operated by Consolidated Mining and Smelting Company between 1919 and 1929 but has since been idle.

"World production of fluorspar has averaged about half a million short tons annually in recent years, the United States and Germany supplying about 75 per cent of the total. The remainder has come mainly from Russia, the United Kingdom, Newfoundland, France, Korea, Italy, and the Union of South Africa. The United States produced a record total of 320,000 short tons in 1941, an increase of 37 per cent over 1940. The Newfoundland production has been increasing steadily and now supplies a large part of the Canadian demand. Canada in peacetime used from 12,000 to 15,000 tons of fluorspar a year, about half of it in the steel trade. The expansion in the production of aluminium will materially step up the demand for acid-grade spar.

"Standard fluxing gravel, or lump grade, fluorspar for metallurgical use is usually sold on a specification of 85 per cent CaF_2 , with not over 5 per cent silica. It should not contain more than 15 per cent of fines. Domestic production has been considerably under 85 per cent CaF_2 , with shipments lower even than 60 per cent, but marketing of such grades is subject to individual purchase agreement. The price of domestic metallurgical grade fluorspar for Canadian consumption was set in 1942 by the Metals Controller on the following basis: \$24 in U.S. funds, per short ton, f.o.b. Kentucky-Illinois mines, plus 11 per cent exchange, plus 10 per cent war exchange tax, plus freight from above field to Canadian consuming point, less freight from Canadian mine to same point, less 25 cents for each per cent CaF_2 below 85 per cent. As an example, this would work out at \$36.36 per short ton for standard 85 per cent grade, f.o.b. Madoc, for shipment to Sault Ste. Marie, Ontario, or \$32.38 for shipment to Hamilton, Ontario.

"Glass and enamel grades call for not less than 95 per cent CaF_2 , with a maximum of $2\frac{1}{2}$ per cent silica and 0.12 per cent iron (Fe_2O_3). The material must be in ground form in various mesh sizes from coarse to extra fine. American quotations for this grade throughout 1942 were \$34 per ton, in bulk, f.o.b. Illinois mines. Acid-grade spar, lump, gravel, and ground, has the strictest specification, minimum 98 per cent CaF_2 , and not over one per cent silica. It sold in January, 1942, at \$32, f.o.b. mines, rising to \$35 in June-December. There is little or no production of such grades in Canada so that no price stabilization has been placed in effect regarding them." (Bureau of Mines, Ottawa.)

Table 216.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry, 1941 and 1942

Industry	1941		1942	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
Steel furnaces.....	17,054	366,701	20,133	562,480
Chemicals (acids, alkalis and salts).....	12,360	394,833	21,689	684,194
Glass.....	185	7,984	231	10,273
Ferro-alloys.....	539	14,659	553	21,293
Enamelling and glazing.....	153	6,120	103	4,120
Total accounted for.....	30,291	790,297	43,009	1,282,270

GARNET

Canadian production (mine shipments) of garnet in 1942 totalled 17 short tons valued at \$176, compared with 16 short tons worth \$160 in 1941. Production during both years came from a deposit located near River Valley in Ontario. The mineral was exported in the form of garnet schist to the United States.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

Commercial garnet belongs to a group of complex silicate minerals of which almandite, the brownish-red iron-aluminium silicate is generally considered the hardest and the best as an abrasive. Garnet is a rather common mineral constituent of certain rocks distributed throughout the Dominion and it usually occurs as a garnetiferous-gneiss, large areas of which are known in parts of Ontario and Quebec. At present, however, the amount of garnet produced in the Dominion is negligible.

Operations in 1942 were carried out intermittently by the Canada Garnet Company near Labelle, Quebec and by a producer near River Valley, north of North Bay, Ontario.

Attempts in the past to produce commercial garnet in Canada have failed owing to the small extent to which it is used; to the competition from high-quality United States material; and to the fact that garnet possessing abrasive efficiency equal to that obtained in the United States has not as yet been found in sufficient quantities. Consumption in Canada has never been more than 225 tons of graded grain a year, all of which is supplied by the United States.

"The specifications for garnet for use in the making of high-quality abrasives are somewhat exacting. The individual crystals should be clear and free from embedded impurities and from minute fractures. They should be of a deep wine-red colour, and not smaller than pea size, walnut size or larger being preferable. The garnet should be tough, but should yield sharp and angular grains when crushed. The deposits should be extensive and the garnet content should not be less than 25 per cent. It should also be close to rail transportation and industrial centres. Few, if any, of the hundred or more garnet deposits so far examined in Canada fulfill all of these requirements. Minor uses for garnet or garnet rock, are for sand-blasting and to a very small extent in the surfacing of plate glass.

"Canadian consumption of prepared garnet grain suitable for 'sand paper' manufacture has decreased and is now less than 200 tons annually. Competition from United States producers and the high quality of their garnet have prevented exports of Canadian garnet to that country.

"The price in the United States of the best quality concentrate from which grain is prepared for abrasive papers and cloths ranges from \$65 to \$80 a ton f.o.b. mines and of graded grain, \$90 a ton. Some sales of garnet fines for use in the surfacing of plate glass were made at about \$26 a ton delivered, and garnet for use in sand-blasting sold at \$20 to \$30 a ton. Canadian prices of crushed garnet rock for sand-blasting were about \$7 a ton.

"Crude garnet ore or ungraded mixed concentrate enters the United States duty free, the duty on grain graded into separate sizes and specially prepared garnet being one cent a pound."

GRAPHITE

Canadian production (mine shipments) of graphite in 1942 was valued at \$117,904, compared with \$132,924 in 1941. The output during both years came from the retreatment of old tailings accumulated at the Black Donald mine in Renfrew county, Ontario. The mineral was marketed in three grades, amorphous, flake and dust. The only other official return relating to graphite properties received by the Dominion Bureau of Statistics in 1942 reported only prospecting of deposits in Hincks township, Quebec.

The following information was taken from a report prepared by the Bureau of Mines, Ottawa:

"Graphite is widely distributed in the Archean rocks of western Quebec and eastern Ontario, in which regions there was formerly a somewhat extensive graphite industry. With the exception of the Black Donald Mine in Ontario these operations have long been idle and the plants for the most part have been dismantled. The Canadian deposits include bands or lenses of graphitic gneiss; belts of crystalline Grenville limestone carrying disseminated flake; and smaller, but often rich, pockety bodies or veins of coarsely crystalline graphite of plumbago character, usually also in limestone. Near Saint John, in New Brunswick, bodies of amorphous graphite were worked many years ago on a small scale.

"Black Donald Graphite Company, with mine and mill at Whitefish Lake, 13 miles west of Calabogie, Renfrew county, Ontario, was again the only producer. The company has been in continuous operation for more than 30 years, mining a deposit of exceptional size and richness. The size of flake produced is too small for crucible use, but is well adapted for foundry facings and lubricants, for which purpose most of the output is sold. Most of the material treated in recent years has been rich mill tailing from early operations which was discharged into Whitefish Lake from where it is recovered by pumping. Mining on the property was suspended several years ago, the main orebody being considered worked out. In 1942 a geological investigation of the deposit, together with a diamond-drilling program, was undertaken by Frobisher Exploration Company, (Ventures Limited), and a substantial tonnage of new ore was proved. Black Donald Graphite Company continued in operation until the end of the year when it was taken over by Ventures which intends to proceed with new underground development under the name of Black Donald Graphite Limited. Most of the production in the past consisted of various grades and mesh sizes of milled products and went to the American and domestic foundry trade. Since the outbreak of war much of it has been reserved for the greatly increased domestic demand.

"During 1942, as the result of a threatened shortage of crucible flake graphite, the United States Government became interested in the possibility of a supply of such material from Canada. Prospecting for new deposits was encouraged, and a number of new occurrences were brought to governmental attention, on some of which surface stripping was done by established mining companies with a view to possible development. Various properties including old, defunct mines, were examined by the Bureau of Mines and the Metals Controller's Office, Ottawa, in company with representatives of the U.S. War Production Board, and several sample shipments were tested in the Bureau of Mines laboratories. The threatened emergency was averted by the British occupation of Madagascar and it was not found necessary to take further steps to encourage interest in the development of a Canadian supply. Ore reserves at many of the old properties are believed to be considerable and could probably be used in an emergency, though this would entail the erection of new mills, or possibly of a central custom mill, to treat the ore.

"World production of natural graphite of all grades and including flake, crystalline (plumbago) and amorphous, averaged about 140,000 short tons a year prior to the war. Madagascar, Germany, Austria, and Czechoslovakia were then the principal producers of flake graphite; Ceylon of crystalline; and Mexico and Korea of the amorphous variety. Substantial reserves exist in the United States, but proved uneconomical to work in peacetime. Development was undertaken in 1942, under Government auspices, of deposits in Pennsylvania, Alabama, and Texas, to provide a domestic supply of crucible flake.

"Canadian graphite requirements are principally for the foundry, dry battery, and paint trades. Foundry needs are met in part by domestic (Black Donald) production, and in part by imported Ceylon plumbago. The battery trade uses mainly Mexican amorphous; and paint requirements are filled largely by low-grade amorphous and flake. Owing to the fine grinding required to free the graphite, the ores of many of the earlier-worked Canadian deposits yielded a relatively small proportion of high-value coarse crucible flake. In the interval, also, crucible graphite specifications have become much stricter and in addition to size of flake and carbon content, have stipulations regarding fusibility of ash, break-down, and volume. In general a No. 1 crucible flake should be coarser than 50-mesh, with about 40 per cent standing on a 35-mesh screen and 40 per cent on a 28-mesh screen. Carbon content should be 85 per cent or better.

"Despite feared shortages American graphite prices have remained substantially at pre-war levels. No. 1 crucible flake was set, under agreement during 1942, at 13 cents per pound, and No. 2 crucible flake (minus 50 plus 70-mesh) at 11 cents. Ceylon crucible lump sold at 10 to 11 cents; carbon lump, 9 to 10 cents; chip, 7 to 8 cents; dust, 4 to 5 cents: all prices ex dock New York, duty paid. Mexican amorphous was quoted at \$14 to \$25 a ton, according to grade, f.o.b. New York.

"Artificial graphite is made in Canada by Electro-Metallurgical Company of Canada, at Welland, Ontario and by the Exolon Company at Thorold, Ontario. These companies supply the United States with part of its requirements."

Table 217.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1941 and 1942

Industry	1941		1942	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Paints and varnishes.....	85	9,416	103	11,855
Polishes.....	40	4,466	39	5,020
Foundries.....	367	53,406	410	59,874
Acids and salts.....	74	32,345	114	34,582
Prepared foundry facings.....	583	41,516	316	19,108
Total Accounted for.....	1,149	141,149	982	130,439

GRINDSTONES AND PULPSTONES

"Material suitable for these stones occurs in certain sandstone beds in Nova Scotia, New Brunswick, and on the British Columbia Coast. Many years ago the output was considerable, but most of the known beds have been depleted and the demand for natural stones has fallen off.

"The Read Stone Company, Sackville, New Brunswick, was the only producer of grindstones in Canada and shipped from quarries near Stonehaven, on the Bay of Chaleur, New Brunswick. The total grindstone sales amounted to 200 tons valued at \$8,000 in 1942.

"The large-size Canadian grindstones are used mainly for sharpening pulp-mill and tobacco knives; and in the United States in the file, machine-knife, granite tool, and shear manufacturing industries. The small stones are used for scythe and axe grinding. Because of the competition from the artificial grinding wheel and from foreign natural stones, production of grindstones from quarries continues to decline.

"There has been no output of pulpstones since the J. A. and C. H. McDonald Company ceased production five years ago from the sandstone beds on the northwest end of Gabriola Island, near Nanaimo, Vancouver Island, British Columbia.

"Good pulpstones are in demand, particularly for use in the large magazine grinders, but as known Canadian deposits containing thick beds of sandstone of the proper quality appear to have been worked out, production for the present has ceased. There is also an increasing competition from Canadian-made artificial segmental pulpstones mainly of silicon carbide grit and at present about 560 of these stones are in use in the various Canadian pulp mills. The imported natural pulpstones come mainly from West Virginia, United States.

"Over 35,000 small hand-operated scythestones, with a total weight of 16 tons and valued at \$2,000, were sold in 1942 by the Read Stone Company. These stones have for many years been obtained from the same quarry from which the company's grindstones are produced, but from finer textured beds of the sandstone.

"The production of all grades of stone in 1942 was 216 tons valued at \$10,000. (Bureau of Mines—Ottawa).

Table 218.—Production of Grindstones, Pulpstones and Scythestones in Canada, 1933-1942

Year	Tons	\$
1933.....	495	21,919
1934.....	987	46,478
1935.....	708	34,010
1936.....	569	24,724
1937.....	412	21,429
1938.....	306	16,198
1939.....	304	15,278
1940.....	341	14,543
1941.....	188	11,500
1942.....	216	10,000

Table 219.—Production of Natural Abrasive Stones, by Kinds, 1942

	Pulpstones		Sharpening stones		Grindstones	
	Tons	\$	Tons	\$	Tons	\$
Nova Scotia.....						
New Brunswick.....			16	2,000	200	8,000
Canada.....			16	2,000	200	8,000

Table 220.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1933-1942

	Number for 2 ft. wood		Value		Number for 2-5 ft. wood		Value		Number for 4 ft. wood		Value	
		\$		\$		\$		\$		\$		\$
1933.....	321	98,475			95	31,945			199	223,635		
1934.....	378	103,811			84	29,680			268	292,359		
1935.....	417	116,501			52	20,297			237	243,805		
1936.....	463	120,227			61	19,478			253	281,265		
1937.....	392	123,598			84	21,700			280	382,084		
1938.....	306	92,822			37	13,351			186	238,483		
1939.....	242	60,622			60	22,443			203	238,620		
1940.....	311	96,957			110	49,899			163	257,628		
1941.....	295	127,349			77	35,843			97	215,913		
1942.....	237	100,466			53	23,898			94	208,986		

THE ARTIFICIAL ABRASIVES INDUSTRY

The factory selling value of all products made during 1942 by the manufacturers in Canada of artificial abrasives and artificial abrasive products amounted to \$33,631,201. This value represented a gain of 32 per cent over the total of \$25,556,330 for 1941.

There were 15 firms engaged in manufacturing artificial abrasives and their products during the year, and of these, 13 were located in Ontario and 2 in Quebec.

The average number of employees in the industry was 2,866, and payments in salaries and wages totalled \$5,106,652. Expenditures for manufacturing materials amounted to \$10,245,679, and \$2,469,824 was paid out for fuel and electricity. Capital investment in the industry totalled \$11,842,400, of which \$4,693,377 was the value placed on land, buildings and equipment.

Artificial abrasives were made by 4 plants in Ontario and 2 in Quebec. The output of these 6 works was valued at \$28,400,025 and included 160,935 tons of crude fused alumina at \$17,750,623; 44,410 tons of crude silicon carbide at \$5,494,257, and other products and by-products, such as ferrosilicon, firesand, refractory brick, refractory cements, calcium boride, boron carbide and abrasive wheels. An average of 2,277 people were employed and salaries and wages totalled \$3,914,643.

Nine other plants were occupied chiefly in making abrasive products, such as wheels, paper, pulpstones and sharpening stones; 7 made abrasive wheels and segments, 4 made sharpening stones and files, and 2 made abrasive cloth and paper. The value of all products made in these establishments was \$5,231,176. The number of employees was 589 and payments for salaries and wages amounted to \$1,192,009.

Table 221.—Materials Used in Manufacturing, 1941 and 1942

Material	Unit of measure	1941		1942	
		Quantity	Cost at works	Quantity	Cost at works
Bauxite and pure alumina.....	ton	151,815	\$ 4,010,127	197,377	\$ 5,427,524
Coal (not for fuel)—					
For fused alumina.....	ton	345	2,182	662	4,243
For silicon carbide.....	ton	8,345	60,258	7,379	60,434
Coke (not for fuel)—					
For fused alumina.....	ton	8,859	55,065	11,959	75,950
For silicon carbide.....	ton	32,750	413,275	48,024	664,699
Electrodes.....	ton	2,335	286,685	3,617	437,663
Feldspar.....	ton	84	3,127	119	6,113
Iron borings.....	ton	13,550	172,713	20,830	261,304
Salt.....	ton	413	4,230	392	4,172
Sawdust.....	ton	9,129	28,113	10,820	36,243
Silica sand.....	ton	57,362	269,605	76,943	416,806
Artificial abrasive grains—					
Fused alumina.....	ton	5,524	736,569	5,106	904,578
Silicon carbide.....	ton	1,429	263,571	1,849	318,198
Natural abrasive grains—					
Garnet.....	lb.	392,846	38,074	350,314	33,982
Emery.....	lb.	233,765	20,325	321,883	22,614
Quartz or flint.....	lb.	348,167	6,624	459,991	7,640
Other.....	lb.	93,568	9,378	72,575	7,415
Bonding and bushing materials—					
Clay bonds.....	lb.	907,697	40,479	988,632	38,869
Silicate (quantity in equivalent solid form).....	lb.	14,374	623	15,930	881
Elastic mixture.....	lb.	30,028	6,489	48,528	12,729
Bakelite and synthetic resins.....	lb.	215,784	76,936	409,614	140,954
Lead for bushings.....	lb.	113,203	6,307	111,130	5,870
Cotton cloth.....			172,727		97,310
Kraft paper.....			82,767		23,250
Containers and packing material.....			71,384		102,788
All other materials.....			812,750		1,133,450
Total.....			7,650,413		10,245,679

Table 222.—Products Manufactured, 1941 and 1942

Product	1941		1942	
	Short tons	Selling value at works	Short tons	Selling value at works
Crude silicon carbide.....	32,258	\$ 3,661,868	44,410	\$ 5,494,257
Crude fused alumina.....	130,851	13,665,811	160,935	17,750,623
Silicon carbide firesand, etc.....	1,096	30,839	268	17,062
Abrasive wheels and segments.....		3,713,303		5,075,258
Sharpening stones and files.....		191,737		251,320
Ferrosilicon.....	10,480	124,383	12,875	187,664
Other products (*).....		4,168,319		4,855,017
Total.....		25,556,336		33,631,201

(*) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by one or two companies.

KYANITE

The following information is from a recent bulletin of the "Imperial Institute", London, (Vol. XXXVI—No. 4). Kyanite, a natural silicate of alumina (Al_2SiO_5 or $\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$) is finding a steadily growing market for the preparation of refractories. It is not used in the raw state, but is first fired at $1,450^\circ$ to $1,500^\circ \text{C}$., and then ground ready to mix with the bond. The product of calcination, however, is known in the trade as "Sillimanite", a misnomer which often leads to confusion. Sillimanite and andalusite are other natural minerals of exactly the same chemical composition as Kyanite (but different in physical properties), and both are likewise converted on heating into mullite and silica. The conversion of andalusite into mullite is not accompanied by any change in volume and this mineral can therefore be used in the raw state as a refractory. Mullite made from Kyanite is used in the construction of numerous types of furnaces, including electric furnaces and those for the enamelling and glass industries. When added to ceramic compositions containing clay and kaolin, it is claimed to reduce shrinkage, lower the coefficient of expansion, increase breaking strength, resistance to abrasion and electrical resistance, and extend the sintering range. It is also a constituent of certain spark-plug porcelains.

Kyanite is usually a rock-forming mineral, and only rarely does it occur in large monomineralic masses as segregations in quartz-kyanite gneiss or schist. Indian kyanite is the most popular at the present time; the production in India commenced in 1924 and amounted to 24,787 tons in 1936. The mineral also occurs in Nyasaland, British East Africa and Western Australia.

The leading andalusite mine in the world is operated by Champion Sillimanite, Inc., in the White Mountains, California; this Company is a subsidiary of the Champion Spark Plug Co., Detroit, Mich.

None of the minerals, kyanite, sillimanite or andalusite are commercially mined in Canada at the present time and any imports of these minerals into Canada are not shown separately in the Canadian Customs classification. "Metal and Mineral Markets"—New York—June, 1943 quoted kyanite—per ton f.o.b. North Carolina and Georgia \$22.00 to \$32.00.

LITHIUM MINERALS

Commercial mine shipments of Canadian lithium minerals were only recorded in 1937. These were made by the Lithium Corporation of Canada, Limited, from deposits located at Bernie Lake, near Pointe de Bois, Eastern Manitoba. For further details refer to chapter 5.

MAGNESITIC DOLOMITE AND BRUCITE

Canadian production of magnesitic dolomite, including brucite, was valued at \$1,059,374 in 1942. This represents the total value of magnesitic dolomite sold and used direct as crude unburnt material plus the process value of dead-burned used and the market value of calcined and dead-burned sold as such; also included for the first time in 1942 is the value of brucite concentrates shipped by the Aluminum Company of Canada Limited from its new plant located at Wakefield, Quebec. Magnesitic dolomite production in Canada is confined entirely to the province of Quebec. Brucite was produced commercially in Canada for the first time in 1942 and the value of magnesitic dolomite only, produced in the Dominion in 1941, totalled \$831,041. The following was abstracted from a report prepared by the Bureau of Mines, Ottawa:

"Magnesitic dolomite consisting of an intimate mixture of magnesite and dolomite is quarried at Kilmar and at Harrington East, in Argenteuil county, Quebec, and is processed for use as refractory materials. Products at present marketed include caustic-calcined magnesitic dolomite, dead-burned or grain material, bricks and shapes (both burned and unburned), finely ground refractory cements, and, in combination with chrome, the dead-burned material is used as an ingredient in certain other types of refractory. Magnesia products made in Canada from imported magnesite and magnesia include fused magnesia (artificial periclase), optical periclase, and "85 per cent magnesia" pipe covering.

"Large deposits of magnesite containing considerable silica and alumina occur in British Columbia near Marysville, between Cranbrook and Kimberley. They are owned by Consolidated Mining and Smelting Company of Canada, Limited, and experimental work to remove the silica and alumina by flotation has been done, but there has been no commercial production to date. A number of other deposits of magnesite are known in British Columbia and Yukon, but either because of their limited extent or remoteness from transportation they are not of commercial importance at present.

"Deposits of earthy hydromagnesite occur in British Columbia near Atlin and Clinton, and at various times some have been worked on a small scale, but there has been no production in recent years.

"Brucite (magnesium hydroxide) in the form of granules thickly disseminated through a matrix of crystalline limestone occurs in large deposits at Rutherglen, Ontario, and at Bryson and Wakefield in the province of Quebec. By a process developed in the Bureau of Mines laboratories, Ottawa, it is possible to recover these brucite granules in the form of magnesia of a high degree of purity and to have hydrated lime as a co-product. A plant using this process is now in operation near Wakefield, Quebec. The granular magnesia produced is at present used mostly for making basic refractories, and for making a special grade of paper.

"Magnesite is available in many countries. Russia is probably the world's greatest producer of magnesite, but almost all is for domestic use.

"Magnesite is usually calcined before shipment and the resultant magnesia is used for the making of refractory products to withstand extremely high temperatures, for making oxychloride cement, and for magnesium metal. It is also the basis of a number of magnesium salts and has many minor uses. The world-wide demand for magnesium metal has greatly stimulated interest in deposits of magnesite. Although until three years ago almost all the world's magnesium was made from magnesium chloride brine and from waste water used in treating potash minerals, magnesite is now an important source of this light metal in Europe, England, and the United States.

"Brucite is much less common than magnesite. The only deposits being worked commercially are in Canada and the United States. The magnesia obtained by calcining brucite may be used for the same purposes as that obtained from magnesite and also has some special applications of its own.

"Competing with magnesite and brucite as sources of magnesia products are dolomite and sea-water. Dolomite, in addition to its use as a refractory material has long been the principal source of basic magnesium carbonate and pure magnesium oxide, and processes have been worked out for the production of magnesium metal from it. The extraction of magnesia from sea-water is being done on a very large scale in England and the United States, the material so obtained being used for making magnesium metal as well as for various industrial and pharmaceutical purposes.

"Prices of calcined magnesite in 1941 f.o.b. Montreal or Toronto as quoted by Canadian Chemistry and Process Industries were \$70 to \$90 per ton. This price has continued since November, 1939, when the price rose from the \$48 to \$60 range that had prevailed for more than a year previously."

Table 223.—Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1931-1942

	Calcined dolomite (b)		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
1931.....			15,773	76,317	(a)	(a)
1932.....			6,725	32,523	420	14,500
1933.....			6,874	30,557	399	14,798
1934.....			14,748	69,104	2,733	105,072
1935.....			18,394	79,914	3,891	149,987
1936.....			43,562	145,502	6,432	230,656
1937.....			53,066	181,146	8,994	326,091
1938.....			40,540	137,127	9,219	336,811
1939.....	14,858	99,838	40,592	78,904	11,401	351,680
1940.....	21,949	136,360	59,284	123,429	13,673	506,032
1941.....	21,608	160,602	71,087	159,037	18,127	682,742
1942.....	22,550	179,427	79,091	225,393	20,685	786,321

(a) Information not available.

(b) Included with crude dolomite prior to 1939.

Relatively large quantities of magnesite or magnesium refractories are also used in the smelting of non-ferrous ores but complete data relating to this consumption are not yet available.

Table 224.—Calcined Magnesite Used by the Artificial Abrasive and Abrasive Products Industry in Canada, 1933-1942

Year	Tons	Value	Year	Tons	Value
		\$			\$
1933.....	(a)	16,430	1938.....		
1934.....	104	6,370	1939.....	121	7,735
1935.....	40	2,448	1940.....	302	19,331
1936.....	418	25,256	1941.....	809	77,508
1937.....	484	29,242	1942.....	398	58,648

(a) Information not available.

MAGNESIUM SULPHATE (EPSOM SALTS)—NATURAL

"Natural hydrous magnesium sulphate (Epsom Salts or Epsomite) occurs in deposits in lake bottoms or in solution in brine lakes in British Columbia. In Saskatchewan, it is found associated with sodium sulphate. Attempts have been made to produce refined salts, and a number of years ago there was a considerable production from several of the 'lakes' in British Columbia, and experimental shipments have been made from one of the lakes in Saskatchewan.

"The largest production has come from the deposits in Basque, British Columbia, the material from which is refined at Asheroft, 15 miles south of the deposit. The refinery, now owned by Asheroft Salts Company, Limited, has a capacity of 10 tons of salt a day. The material produced is of high grade. Operations ceased in the fall of 1942. There are a number of other occurrences in British Columbia, near Clinton, north of Kamloops, and in Kruger's Pass, south of Penticton.

"In Saskatchewan, two lakes south of Wiseton contain brines high in magnesium sulphate, and Muskiki Lake, just north of Dana, contains brine high in magnesium and sodium sulphate, which at certain times of the year, crystallizes into a bedded deposit with layers of both salts." (Bureau of Mines—Ottawa.)

The Canadian production of magnesium sulphate in 1942 was 1,140 tons valued at \$38,760, compared with 265 tons valued at \$7,343 in 1941.

In the chemical industries, Epsom salt finds many applications. It is employed for tanning and in dyeing, and for textile and medicinal use. Magnesium sulphate is used in the paper industry for weighting paper. In the sole leather industry it is used to obtain a clean shiny cut, and it also helps to retain moisture in the leather and increases its weight. Magnesium salt is used in the dyeing industry only to a small extent. In some cases it is used in the after treatment of leather to increase the fastness of the colour in washing. Magnesium sulphate is used extensively and in large quantities in medicine. It is used for various purposes in the manufacture of textiles. In bleaching wool magnesium sulphate is added to destroy the corrosive effect of sodium peroxide. It is also used for weighting textile fabric, especially silk. Mixed with gypsum and ammonium sulphate, it is used in the manufacture of non-inflammable fabrics.

Prices for Epsom salts remained steady, due to the discontinuance of supplies from European countries, hitherto the main sources of supply. Quotations for the technical grade, as given by Canadian Chemistry and Process Industries for Toronto or Montreal delivery, ranged from \$65.00 to \$70.00 per short ton in bags.

Table 225.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and in Tanning, 1935-1942

Year	Pharmaceutical preparations		Tanning	
	Pounds	Value	Pounds	Value
		\$		\$
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	16,120
1937.....	919,825	23,881	992,203	16,165
1938.....	855,547	23,687	1,272,549	14,153
1939.....	830,927	24,091	1,139,670	17,808
1940.....	925,948	31,554	1,646,217	34,242
1941.....	1,043,110	35,389	1,508,824	43,400
1942.....	1,077,601	38,352	1,782,479	45,956

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs totalled 157,085 imperial gallons valued at \$74,505 in 1942 compared with 181,064 imperial gallons worth \$72,531 in the preceding year. Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. François river in Yamaska county; Pottou Springs in Brome county and at Coulombia spring at L'Épiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot Springs in the Fraser Valley and the Halcyon Hot Springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion was 19 in 1942, of which 14 were located in the province of Quebec and 5 in Ontario.

Table 226.—Sales of Natural Mineral Waters (*) by the Canadian Aerated Waters Industry, 1930-1942

Year	\$	Year	\$
1930.....	178,348	1937.....	102,648
1931.....	140,730	1938.....	105,872
1932.....	92,066	1939.....	95,531
1933.....	77,125	1940.....	89,013
1934.....	52,113	1941.....	104,364
1935.....	45,100	1942.....	125,157
1936.....	63,687		

(*) Whether fortified or not.

PHOSPHATE

Canadian production (mine shipments) of phosphate (apatite) during 1942 totalled 1,264 short tons valued at \$17,431; of this production, 930 short tons came from properties in the province of Quebec and 334 short tons from Ontario. The total output of the mineral in the Dominion in 1941 amounted to 2,487 short tons worth \$33,376.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"Phosphate occurs in Canada (1) as apatite, found associated with phlogopite mica in irregular pockety bodies in Precambrian crystalline pyroxenite rock of adjacent sections of south-western Quebec and eastern Ontario, and (2) as bedded, sedimentary phosphate rock of carboniferous and Permo-Jurassic age that extends along the Rocky Mountains divide, or Alberta-British Columbia boundary, from the Crow's Nest area in the south as far north as Jasper.

"The western sedimentary phosphate is rather low-grade and is not considered to be of economic interest under present conditions. Operations by Consolidated Mining and Smelting Company about ten years ago in the Crow's Nest-Michel area resulted in the shipment of 5,000 tons of the rock to Trail, British Columbia, for the manufacture of fertilizer, but attempts to concentrate it proved unsuccessful and the company has since drawn its supplies from Garrison, Montana. Eastern Canadian plants requiring phosphate for fertilizer or for other purposes use mainly Florida rock.

"Mining of apatite has for many years been on a comparatively insignificant scale, the 1941 production of about 2,500 tons being the largest recorded since the closing down of most of the larger mines at the beginning of the century. Since then most of the small output has been mainly by-product material recovered during mica-mining operations, with occasional small tonnages produced by intermittent operators. Chief purchaser has been the Electric Reduction Company, Buckingham, Quebec, for use in the production of elemental phosphorous and various phosphorus compounds. More recently, Canadian Refractories Limited, Kilmar, Quebec, have reported being in the market for small tonnages.

"As offered for sale, the apatite usually consists of cobbled, picked lump, the grade of which may run from 65 to 80 per cent tricalcic phosphate. A slight revival of interest in the possibilities of straight apatite mining was evidenced in 1941-42, and several of the old and larger mines in the Lièvre River section, Papineau county, Quebec, north of Buckingham, were re-opened and yielded most of the material sold. Small plants were installed at some of these properties and a shipping product was made that consisted of a composite of screened fines and cobbled lump of around 60 to 70 per cent grade. Chief operators in Quebec in 1942 were Barry Lake Mining Company, 11 Rue des Ramparts, Quebec, working the High Rock mine; Commercial Mineral Products Company, 680 Sherbrooke Street West, Montreal, working the Old Union and Little Union properties, all the above in West Portland township; and Robert Bigelow, of Buckingham, who re-opened the old Brazeau mine in Bowman township near Val des Bois, with shipments totalling 500 tons, the largest unit production. In Ontario, Canadian Phosphate Mining Company Limited, 125 Holland Avenue, Ottawa, took over the old McLaren Mine in Bedford township near Westport and did considerable work, including diamond-drilling, with shipments of about 200 tons.

"Canadian apatite deposits, though doubtless still containing considerable reserves, tend to be erratic and pockety, and are incapable of supplying more than a small fraction of domestic requirements for phosphate rock, which are of the order of a quarter of a million tons annually. Total production since the inception of mining around 1870 to the end of 1942 was 346,451 short tons valued at \$4,712,894. All of the output in 1942 was used in Canada, mainly for the manufacture of phosphorus. Grade ranged from 60 to 80 per cent. Purchase price basis was \$16 per short ton for 80 per cent material, with a penalty or premium of 20 cents per unit below or above that figure. The average price of imported Florida phosphate, laid down, during the year was \$18 per long ton for 75 per cent grade.

"World production of phosphate is about 11 million long tons annually. By far the greater part of it consists of sedimentary rock, but the Russian output of apatite, produced as concentrate from nepheline-apatite rock, amounts to about 1,000,000 tons a year.

"The United States is the leading producer of sedimentary phosphate, its output in 1941 being more than 4½ million tons. Shipments from Tunisia and Morocco in 1939 totalled over 3,000,000 tons; from Egypt and Algeria, about 500,000 tons each; and from the Pacific islands of Nauru, Ocean, and Christmas, a total of close to 1,500,000 tons. Except for Russia, European countries are deficient in phosphate deposits."

Table 227.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1942

Year	Superphosphate		Phosphate rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	45,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948
1937.....	137,801	1,661,243	101,704	728,572
1938.....	180,243	2,193,699	102,125	765,516
1939.....	174,980	2,026,293	96,319	711,508
1940.....	175,045	2,175,615	143,667	1,262,847
1941.....	143,420	1,719,674	156,035	1,573,165
1942.....	177,421	2,748,290	207,842	2,253,517

PYRITES (Sulphur)

Canadian sulphur production is computed as the sulphur in iron pyrites shipped plus the sulphur recovered from non-ferrous smelter gases. Production in 1942 totalled 303,714 tons valued at \$1,994,891.

No iron pyrites deposits, known as such, have been mined in Canada for some years and statistics published regarding recent pyrites production refer to by-product iron pyrites recovered in the mining and concentrating of copper-gold-silver ores.

Sulphur employed in the manufacture of sulphuric acid during 1942 was recovered from salvaged smelter gas in Ontario and British Columbia. In Ontario, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada, Limited, manufactured sulphuric acid and other chemical products at Trail, using the by-product gases of its metallurgical plants. The Consolidated Mining and Smelting Company reported in 1939 that the percentage of sulphur dioxide removed from the flue gases from metallurgical operations and utilized mainly in the production of sulphuric acid and fertilizers, increased to 70.3 per cent compared with 53.3 per cent in 1937.

The Bureau of Mines, Ottawa, reviews pyrites for 1942 as follows:

"Pyrites is produced in Canada as a by-product in the treatment of copper-pyrites ores at the Aldermac and Noranda mines in Quebec, and at the Britannia mine in British Columbia. No lump pyrites has been produced in Canada for several years.

"In Quebec, Aldermac Copper Corporation's mine and concentrator, twelve miles west of Noranda, were in continuous operation in 1942. The copper concentrate is shipped for treatment to the Noranda smelter, while the high-grade iron pyrites concentrate is shipped partly to chemical plants in the United States and partly to Three Rivers, Quebec, for use by St. Lawrence Paper Mills Company. At the Noranda mine, Noranda, Quebec, pyrites concentrate, a by-product of the milling of copper-gold ores, was marketed for the manufacture of acid. At Three Rivers, all of the pyrites used in the Freeman flash-roasting plant in the mill of St. Lawrence Paper Mills Company is being obtained from the Aldermac mine. The Freeman plant supplies all of the sulphur dioxide and part of the steam required for the operation of the company's sulphite plant.

"In British Columbia, part of the large output of pyrites from the Britannia mine at Britannia Beach was consigned to the acid plant of Nichols Chemical Company at Barnet, British Columbia, and part was exported to plants in the United States. A considerable tonnage of pyrites from previous years' operations has accumulated at Britannia Beach and is awaiting more favourable market conditions.

"Northern Pyrites, Limited completed in 1940 a program of development work that was in progress for four years on its Ecstall pyrites property, located on Ecstall River about sixty miles south of Prince Rupert. A large plant as well as a railway to tide-water is required before active production can commence, but in the meantime, the company is awaiting more favourable market conditions. The Granby Company did considerable exploratory diamond-drilling on the Ecstall property several years ago. According to reports, the orebodies contain 5,000,000 tons of ore averaging 49 per cent sulphur, 42 per cent iron, 2.3 per cent zinc, less than one per cent copper, and about \$1.00 a ton in gold and silver. No work was done in 1942.

"Although the Freeman process of flash roasting, designed for by-product flotation fines that are obtained from the treatment of copper ore, has opened a prospective market for this class of ore, it is not to be assumed that the mining of pyrites will be stimulated. Ample supplies of pyrites fines are already available at strategic points to meet any Canadian demand.

"There is apparently no standard price in Canada for sulphur in pyrites. Most contracts are believed to be based on a price of 5 cents or better per unit (22.4 pounds) of sulphur per long ton, f.o.b. cars at point of production."

Table 228.—Production in Canada of Pyrites with Sulphur Content, Including Sulphur Contained in Sulphuric Acid, etc., Made from Smelter Gases, 1941 and 1942

	Pyrites (*)			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
			\$		\$		\$
1941							
Quebec.....	298,761	146,826	575,422			146,826	575,422
Ontario.....				10,057	100,570	10,057	100,570
British Columbia.....	4,599	2,303	18,424	(†)100,837	1,008,370	103,140	1,026,794
Canada.....	303,360	149,129	593,846	110,894	1,108,940	260,023	1,702,786
1942							
Quebec.....	351,570	168,832	673,965			168,832	673,965
Ontario.....				18,634	186,340	18,634	186,340
British Columbia.....	27,923	13,947	111,576	102,301	1,023,010	116,248	1,134,586
Canada.....	379,493	182,779	785,541	120,935	1,209,350	303,714	1,994,891

(*) Recovered from copper ore deposits.

(†) Includes elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

The production of sulphuric acid in Canada totalled 578,474 tons (66° Be') in 1942 compared with 468,712 tons in 1941.

Table 229.—Consumption of Sulphur by Specified Canadian Industries, 1940-1942

Industry	1940		1941		1942	
	Tons	\$	Tons	\$	Tons	\$
Wood-pulp.....	182,357	4,157,629	201,575	5,062,266	211,466	5,687,331
Petroleum refining.....	61	3,110	51	2,649	31	1,551
Acids, alkalis and salts.....	22,595	479,875	44,784	1,091,913	65,056	1,694,232
Matches.....	67	3,116	65	3,393	80	4,119
Explosives.....	1,850	38,390	2,934	58,486	2,057	57,631
Insecticides.....	1,168	41,080	962	35,722	1,293	50,310
Adhesives.....	71	2,429	82	3,031	89	3,087
Chemicals, miscellaneous.....	2	121	3	40	3	27
Rubber.....	1,492	75,219	2,067	106,411	1,728	93,042
Sugar.....	167	8,494	147	6,877	142	7,411
Fruit and vegetable preparations.....	58	3,668	59	5,206	130	10,685
Other industries (*).....	269	10,107	278	11,603	287	12,248

(*) Starch and glucose, dyeing and finishing of textiles.

SILICA BRICK

The production of silica brick in Canada during 1942 totalled 4,273 M valued at \$263,006 compared with 4,111 M worth \$238,433 in 1941. The manufacture of these refractories was confined, in both years, to the plants of the Dominion Steel and Coal Company, Ltd., at Sydney, Nova Scotia, and the Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized in furnace construction and repairs.

SODIUM CARBONATE (NATURAL)

Production of natural sodium carbonate in Canada during 1942 totalled 256 short tons valued at \$2,048 compared with 186 tons at \$1,488 in 1941. Deposits of this material in the form of "natron" (sodium carbonate with 10 molecules of water) and also as brine, occur in a number of "lakes" throughout the central part of the province of British Columbia, chiefly in the Clinton mining division, around 70 Mile House, and in the neighbourhood of Kamloops. Production in Canada during recent years has come entirely from deposits in British Columbia and in 1942 all commercial shipments of primary or mine material were made from Chasm on the line of the Pacific Great Eastern Railway. The first commercial shipments of natural sodium carbonate from Canadian deposits were recorded for 1921 in which year 197 short tons valued at \$14,775 were reported as sold. The total Canadian production of the material to the end of 1942 amounted to 9,121 short tons valued at \$105,166.

Sodium carbonate, or "soda ash", has many industrial uses, such as in the manufacture of glass and soap, in the purification of oils and of bauxite for the production of aluminium, and in the flotation of minerals. Owing to technical advances, the use of soda ash in the glass industry continued to grow. The next largest use of sodium carbonate is in the production of sodium hydroxide or caustic soda. An interesting new use for sodium carbonate is in the manufacture of "synthetic salt cake" (anhydrous sodium sulphate). Considerable quantities of soda ash are also consumed in the smelting of iron ores.

As the present known Canadian deposits are far from the main markets, the output is restricted to the requirements of consumers within economic rail haul from the deposits. Eastern consumers of soda ash obtain their supplies from the chemically prepared material made from salt by the Solvay or ammonia process in Ontario and in the United States.

The price of "soda ash" in 1942 as given by the Canadian Chemistry and Process Industries remained at \$2.00 per bag of 100 lb. throughout the year.

Table 230.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries, 1941 and 1942

Industry	Unit of measure	1941		1942	
			\$		\$
Chemicals and allied products (a).....	pound	58,276,976	838,851	60,781,598	900,378
Manufactures of non-metallic minerals (b).....	pound	88,314,000	1,084,860	100,077,366	1,471,513
Pulp and paper.....	ton	3,311	105,855	3,476	120,465
Textiles (dyeing and finishing).....	pound	479,806	8,902	573,909	11,027
Sugar refineries.....	pound	225,721	4,924	378,112	8,762
Dyeing, cleaning and laundry work.....	pound	1,145,101	31,017	1,075,469	28,724

(a) Includes acids, salts, explosives, soap, etc.

(b) Includes coke and gas, glass and petroleum refining.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Production (mine shipments) of natural sodium sulphate in 1942 totalled 131,258 short tons valued at \$1,079,692 compared with 115,608 short tons worth \$931,554 in 1941. Commercial shipments in both years were made almost entirely from properties located in Saskatchewan. A relatively small quantity was produced annually in Alberta during the years immediately preceding 1942.

During the year under review, Midwest Chemicals Limited operated continuously at White-shore Lake, Saskatchewan; at Sybouts Lake, 9 miles south of Gladmar, Saskatchewan. Sybouts Sodium Sulphate Company Limited was in steady production throughout the year; at Ormiston, Saskatchewan, the Horseshoe Lake Mining Company Limited was active during the entire year and in the same province commercial shipments were made by Natural Sodium Products Limited from both Frederick Lake, near Bishopric, and from the company's new property at Alsask Lake. Two small producers reported shipments of small quantities of sodium sulphate for local consumption.

The Bureau of Mines, Ottawa, describes sodium sulphate as occurring as crystals or in the form of highly concentrated brines in many lakes throughout Western Canada. The material produced in Canada is both hydrated sodium sulphate known as Glauber's Salt and hydrous sodium sulphate, known to the trade as "Salt Cake". The operating plants in Western Canada are capable of producing over 900 tons of dried salts a day, and if necessary the tonnage could be greatly increased. Complete figures for world production of salt cake are not available, and it is difficult to compare the returns from different countries as the production comes from chemical plants and from natural deposits. In the chemical industries, Glauber's Salt is used widely and the demand is increasing. Sodium sulphate is used extensively in the pulp and paper, glass, dye, and textile industries, and to a lesser extent for medicinal and tanning purposes. It is also used extensively in the nickel-copper smelting industry for the separation of the two metals. The price for natural anhydrous sodium sulphate from deposits in Western Canada ranged from \$8.00 to \$8.50 per short ton, f.o.b. plant.

Table 231.—Salt Cake used in the Manufacture of Canadian Wood Pulp, 1932-1942

Year	Tons	\$	Year	Tons	\$
1932.....	24,301	489,343	1938.....	33,213	583,217
1933.....	29,563	580,251	1939.....	40,685	722,178
1934.....	34,559	655,905	1940.....	53,540	994,875
1935.....	35,350	642,801	1941.....	61,679	1,133,623
1936.....	41,524	711,635	1942.....	70,078	1,303,451
1937.....	50,584	884,437			

Table 232.—Sodium Sulphate used in the Canadian Acids, Alkalies and Salts, and Medicinal and Pharmaceutical Industries, 1932-1942

Year	Textile Industry (a)		Acids, Alkalies and Salts Industry		Medicinal and Pharmaceutical Industry	
	Tons	\$	Tons	\$	Tons	\$
1932.....			94	(*) 1,811		
1933.....			9,929	141,322	39	4,879
1934.....			26,075	368,576	51	7,278
1935.....			22,485	316,734	59	4,617
1936.....			7,220	(*) 102,176	27	2,546
1937.....			8,006	(*) 113,054	29	2,234
1938.....	323	8,419	3,412	(*) 48,486	21	1,593
1939.....	401	11,636	11	(*) 314	23	1,940
1940.....	522	13,607	14	(*) 416	21	1,820
1941.....	884	25,390	10	(*) 326	34	3,073
1942.....	860	24,831	107	(*) 2,040	40	4,626

(a) Dyeing and finishing.

(*) Does not include sodium sulphate consumed direct in the smelting of nickel-copper ores. In 1942 the quantity used for this purpose totalled 21,531 short tons.

STRONTIUM MINERALS

The Bureau of Mines, Ottawa, in a 1942 review of strontium minerals states:

"Several occurrences of celestite (strontium sulphate) of possible economic interest are known in Canada, and in 1920-21, some ground material produced from a deposit in Bagot township, Ontario, was sold to the paint trade. The material from this deposit is coarsely-fibrous in character and is not very pure, containing about 18 per cent of barium sulphate. It is accordingly not favoured for chemical use, but is regarded as suitable for paints and general filler or loader use. The old pit was pumped out in 1941 and a few tons of ore were scaled down from a small drift. This, along with some stockpile material was shipped to Montreal for grinding. The product was used in the paint trade as a substitute for barite, but is reported to have found little favour, and no further work was done. Celestite of similar character and analysis occurs at some of the old fluorspar mines of the Madoc area in Ontario, and part of it might be recoverable from the waste dumps.

"Celestite, analysing 98 to 99 per cent strontium sulphate, occurs as a small vein of coarse platy crystals in Lansdowne township, Ontario, and some of it was mined many years ago. Calcite appears to be the only associated mineral and recovery of a concentrate of high purity should be easily made by jigging and tabling. In the event of a war shortage of imported strontium compounds, this deposit probably offers the best possibility for supplying the deficiency, though the indicated tonnage is small. Celestite similar to this occurs in a small galena prospect shaft in Fitzroy township, in Ontario, analysis of selected material showing 93 per cent strontium sulphate. A moderate supply might be obtained from this source, but the ore would probably need to be concentrated. No important deposits of strontianite (strontium carbonate) are known in Canada.

"World production of strontium minerals is estimated at 5,000 to 7,000 tons a year. England is the principal source of supply, with Germany next. The United States produced 4,724 tons of strontium minerals in 1941. Important deposits are reported to occur in India and Newfoundland, but there has been no production from these sources as yet.

"Celestite is the principal source of strontium used in the manufacture of the various strontium salts, and strontianite, a less common mineral, is used for the same purpose. The nitrate, carbonate, and hydrate are the most important of the strontium compounds used in industry and medicine. Strontium nitrate is employed mainly in pyrotechnics, for fireworks, railroad signal flares, and military flares and rockets, to which it imparts the characteristic strong red flame colour of the element. Other strontium compounds are employed in tracer bullets and shells. The hydrate is used chiefly in the refining of beet sugar by the Scheibler process.

"Strontium metal, made from either the natural sulphate or carbonate, is used in limited quantities in certain alloys, mainly of copper, tin, lead, zinc, and cadmium.

"As yet, there is no serious shortage of strontium minerals in North America and supplies of ore from Great Britain are available. The United States production was supplemented by imports, most of it from England and Mexico.

"Trade in strontium minerals is mainly confined to a few importer-dealers, with sales based on individual contract. Price quotations in American trade journals in 1942 for powdered celestite, 92 per cent grade, remained unchanged at \$45 a ton; crude domestic ore sold at \$15 to \$20 a ton f.o.b. mines. Crude lump strontianite, 84 to 86 per cent grade, was quoted at \$55 a ton, while the manufactured carbonate of 90 per cent purity sold at 15 to 18 cents a pound. Strontium nitrate, one of the chief commercial salts, remained at about 8 cents a pound."

VOLCANIC DUST

There has been no Canadian production of volcanic dust since 1934. In that year, 31 tons valued at \$620 was shipped chiefly from deposits located at Williams Lake, B.C. The following is abstracted from a report prepared by the Bureau of Mines, Ottawa:

"Deposits of volcanic dust (pumice dust) are found in Saskatchewan, Alberta, and British Columbia. There has been intermittent production from Waldeck, near Swift Current, Saskatchewan, and from near Williams Lake in British Columbia.

"In Saskatchewan, deposits occur also five miles north of Braddock; west of Beverley; and near St. Victor, all of which are grey to buff in colour. Some stripping and prospecting was done during 1940 on a deposit of white volcanic dust overlain by bentonite 5 miles west of Rockglen, and laboratory experiments were carried out during 1940-41 by the University of Saskatchewan on the Rockglen and several of the other deposits of volcanic dust.

"In British Columbia there are several deposits, of which the purest known is a snow-white, fine-grained volcanic dust from the Deadman river, north of Kamloops lake. Extensive beds of compact dust also occur north of Quesnel lake in the Cariboo district but there has been no production.

"The war cut off supplies of high quality Italian pumice, but suitable material is being produced in California.

"In the past, about 60 per cent of the United States output was used as the abrasive base in scouring and cleansing compounds and to a lesser extent for glass bevelling, polishing aluminium, etc., but in 1941 about 43 per cent was used for these purposes and 48 per cent as a concrete admixture and concrete aggregate. The value of the latter, however, was only 11 per cent of the total against nearly 60 per cent for abrasive purposes: 4 per cent for acoustic plaster; and the remainder for asphalt filler, stucco, filtering and insulating media, paint filler, insecticide, floor sweep, and dusting the inside of tires. Some of the United States volcanic dust was also used in the manufacture of fire-proof walls, building tiles and slabs, and in the refining of petroleum."

United States quotations for pumice stone, March, 1942, were: per pound f.o.b. New York or Chicago, in barrels, powdered, 2½ cents to 4½ cents; lump 5 to 7½ cents.

Tripoli was quoted in the United States, 1943: Missouri, f.o.b. 40 mesh \$14.50 per ton.

Table 233.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1941 and 1942

Item	Unit of measure	1941		1942	
		Quantity	Value	Quantity	Value
Barite.....	Ton	6,890	\$ 74,416	19,667	\$ 188,144
Diatomite.....	Ton	344	9,935	365	9,088
Fluorspar.....	Ton	5,534	97,767	6,199	146,039
Garnets (schist).....	Ton	16	160	17	176
Graphite.....			132,924		117,904
Grindstones (b).....	Ton	188	11,500	216	10,000
Lithium minerals.....					
Magnesium sulphate.....	Ton	265	7,343	1,140	38,760
Magnesitic dolomite (c).....			831,041		1,059,374
Mineral waters.....	Imp. gal.	181,064	72,531	157,085	74,505
Peat for fuel.....	Ton	355	2,155	(d)	(d)
Peat moss.....	Ton	27,803	644,253		
Phosphate (a).....	Ton	2,487	33,376	1,264	17,431
Silica brick.....	M	4,111	238,433	4,273	263,006
Sodium carbonate.....	Ton	186	1,488	256	2,048
Sodium sulphate.....	Ton	115,608	931,554	131,258	1,079,692
Strontium minerals.....	Ton	27	280		
Total (Gross).....			\$ 3,059,156		\$ 3,066,167
Sulphur production (*).....	Ton	260,023	1,702,786	303,714	1,994,891

(a) Represents apatite mined in Quebec and Ontario, usually a by-product in mica production.

(b) Includes sharpening stones, etc.

(c) In 1942 includes the value of calcined brucite granules shipped from Wakefield, Quebec.

(d) Compiled as a separate industry in 1942.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct). General statistics relating to production of sulphur included with those of the copper-gold mining and non-ferrous smelting industries.

Table 234.—Principal Statistics Relating to Miscellaneous Non-Metal Mining Industries in Canada, 1941 and 1942

	1941	1942
Number of plants.....	83	64
Capital employed.....	\$ 3,473,984	\$ 4,919,871
Number of employees—On salary.....	119	88
On wages.....	1,231	723
Total.....	1,350	811
Salaries and wages—Salaries.....	\$ 247,213	\$ 142,266
Wages.....	\$ 1,117,603	\$ 999,806
Total.....	\$ 1,364,816	\$ 1,142,072
Selling value of products (gross).....	\$ 3,059,156	\$ 3,066,167
Cost of fuel and electricity.....	\$ 499,370	\$ 656,538
Cost of process supplies used.....	\$ 315,666	\$ 296,322
Selling value of products (net).....	\$ 2,274,120	\$ 2,053,307

Table 235.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1942

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land (excluding minerals).....	698,650
Present value of buildings, fixtures, machinery, tools and other equipment.....	2,754,991
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	355,493
Inventory value of finished products on hand.....	119,614
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	991,123
Total.....	4,919,871

Table 236.—Wage-Earners, by Months, in the Miscellaneous non-metal Mining Industries in Canada, 1940-1942

Month	1940	1941	1942		
			Surface	Underground	Mill
January.....	352	451	221	37	303
February.....	352	463	226	36	332
March.....	392	452	249	41	310
April.....	359	473	250	33	339
May.....	482	559	256	37	346
June.....	472	682	202	35	500
July.....	548	667	274	35	480
August.....	517	696	301	49	469
September.....	604	695	262	63	445
October.....	614	718	251	64	474
November.....	581	659	236	65	502
December.....	451	603	206	57	496
Average.....	489	601	255	49	416

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this Chapter are those industries producing structural materials from non-metallic minerals, rocks and clays of Canadian origin. These industries include those firms engaged in the production of Clay Products, Portland Cement, Lime, Sand, Gravel and Stone.

The combined production of these materials in 1942 totalled \$45,729,807 compared with \$45,373,272 in 1941, or an increase of 0.7 per cent. Compared with 1941, the value of brick and other clay products produced in 1942 showed a slight decrease; both the quantity and value of cement shipments during the year under review were considerably greater than in the preceding year; lime production in 1942 realized a slight increase over 1941 in both quantity and value, a fact partially accounted for by the continued consumption of this material in the expanding chemical industries; output of sand and gravel decreased greatly in 1942, indicating to some extent a falling off in highway construction and road maintenance throughout the older sections of the Dominion. The quantity of stone produced in Canadian quarries during 1942 was somewhat less than in 1941; however, a higher value was realized, reflecting somewhat the generally rising production costs under wartime conditions, and a decreasing demand for lower priced stone used in road work.

The quality of structural materials produced in Canada compares favourably with that of other countries. Most of the larger plants producing cement, clay products, lime, stone and sand and gravel are equipped with modern machinery and the Dominion is endowed with practically inexhaustible deposits of most primary materials required in any building or construction project of the future.

Table 237.—Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1937-1942

Province	1937	1938	1939	1940†	1941	1942
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	2,293,325	1,611,111	1,829,207	1,855,771	1,330,888	1,980,912
New Brunswick.....	1,128,931	2,188,889	1,911,041	936,161	1,145,412	1,305,343
Quebec.....	10,350,583	11,619,514	12,319,773	15,001,749	16,631,657	17,723,293
Ontario.....	15,121,178	11,997,177	12,556,664	16,636,544	18,652,999	16,557,804
Manitoba.....	1,673,124	1,805,875	1,646,797	2,600,304	2,197,095	2,317,933
Saskatchewan.....	585,673	781,224	556,973	906,181	631,732	707,123
Alberta.....	1,303,533	1,627,462	1,947,453	2,971,550	2,626,277	2,836,160
British Columbia.....	2,413,352	2,247,414	2,314,821	2,795,389	3,416,996	3,564,405
Canada—Gross Value.....	34,869,699	33,878,666	35,332,759	43,703,949	46,633,056	46,992,973
Net value.....	28,868,189	28,446,299	29,628,817	34,893,571	35,865,916	35,334,369

† Includes value of cement containers for 1940, 1941 and 1942.

Note: For statistics relating to employment, etc., in these combined industries see totals in Tables 21 and 22, Chapter 1.

Table 238.—Value of Construction Contracts Awarded, by Provinces, 1938-1942
(Maclean Building Reports Ltd.)

Province	1938	1939	1940	1941	1942
	\$	\$	\$	\$	\$
Maritimes.....	19,522,800	16,146,300	21,142,100	36,736,400	26,305,500
Quebec.....	65,778,900	62,846,600	96,326,300	154,541,200	92,235,500
Ontario.....	73,070,100	82,605,500	146,806,100	145,598,600	108,679,500
Manitoba.....	6,115,200	5,374,400	28,003,700	11,701,600	18,914,300
Saskatchewan.....	3,969,000	3,246,100	12,566,700	11,098,700	5,480,200
Alberta.....	8,180,000	5,234,900	23,940,100	15,598,800	14,401,100
British Columbia.....	10,641,900	11,724,700	17,224,800	18,716,000	20,578,000
Canada.....	187,277,966	187,178,500	346,009,800	393,991,300	281,594,100

Table 239.—Total Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments 1937 to 1942
(Construction Branch, Dominion Bureau of Statistics)

	\$
1937.....	351,874,114
1938.....	353,223,285
1939.....	373,203,680
1940.....	474,122,778
1941.....	639,750,624
1942.....	635,649,570

Table 240.—Types of Canadian Construction 1939-42
(Construction Branch, Dominion Bureau of Statistics)

*Type of Construction	1939	1940	1941	1942
	\$	\$	\$	\$
Total Value of Construction.....	373,203,680	474,122,778	639,750,624	635,649,570
Building Construction.....	159,041,080	257,800,560	374,491,173	351,774,680
Residential.....	53,926,429	59,925,197	87,586,340	76,346,090
Institutional.....	21,214,315	17,208,419	15,174,464	14,246,025
Commercial.....	35,100,121	41,745,521	41,157,146	30,638,095
Industrial (includes factories, warehouses, mine buildings, etc.)....	36,654,828	80,624,101	177,698,268	159,346,630
Other (includes armouries, barracks, hangars, etc.).....	12,145,387	58,294,322	52,874,955	71,197,840
Engineering, Harbours, Rivers, etc.....	168,302,939	164,831,545	200,656,038	217,279,062
Streets, highways, etc.....	86,666,394	80,468,279	68,358,529	59,619,536
Bridges, watermain, sewers, dams, reservoirs, etc.....	25,582,167	23,093,053	40,490,145	34,044,730
Electric stations and transmission lines.....	27,520,189	33,718,009	37,090,038	60,697,808
Docks, wharves, piers, etc.....	9,232,258	4,809,071	6,475,872	10,099,471
Other engineering (includes landing fields, parks, canals, dredging, pile driving, etc.).....	19,301,931	42,743,133	48,241,454	52,817,517
Building Trades (Jobbing).....	45,859,661	51,490,673	64,603,413	66,595,828

* This survey is based on reports received from General and Trade Contractors and Subcontractors, Municipalities, the Harbours Board and Dominion and Provincial Departments, and covers alterations, maintenance and repairs, as well as new construction.

Table 241.—The following table gives the total value of construction contracts awarded in Canada from 1925 to 1942, also index numbers of wholesale prices of building materials, and index numbers of wage rates.

Year	Value of construction contracts awarded in Canada	Average index numbers of employment in building construction (1926=100)	Average index numbers of wholesale prices of building materials (1926=100)	Index of wage rates in the building trades (1935-39=100)
	(a)	(b)	(c)	(d)
	\$			
1925.....	297,973,000	75.8	102.9	103.1
1926.....	372,947,900	100.0	100.0	104.2
1927.....	418,951,600	108.7	96.1	108.5
1928.....	472,032,600	112.0	97.4	112.3
1929.....	576,651,800	135.3	99.0	119.6
1930.....	456,999,600	134.3	90.8	123.0
1931.....	315,482,000	104.3	81.9	118.5
1932.....	132,872,400	54.1	77.2	107.9
1933.....	97,289,800	38.5	78.3	95.6
1934.....	125,811,500	47.8	82.5	93.7
1935.....	160,305,000	55.4	81.2	96.7
1936.....	162,588,000	55.4	85.3	97.3
1937.....	224,056,700	60.1	94.4	100.1
1938.....	187,277,900	60.1	89.1	102.5
1939.....	187,178,500	62.1	89.7	103.3
1940.....	346,009,800	83.5	95.6	105.7
1941.....	393,991,300	(e) 139.5	107.3	111.7
1942.....	281,594,100	157.9	115.2	115.4

(a) Compiled by MacLean Building Reports Ltd.

(b) Employment Statistics Branch, Dominion Bureau of Statistics.

(c) Internal Trade Branch, Dominion Bureau of Statistics.

(d) Labour Department: 8 trades 1925-1926; 9 trades from 1927 to 1942; 13 cities to 1927; 14 cities to 1939, hereafter 31 to 42 cities.

CEMENT INDUSTRY

Producers' sales of cement in 1942 as reported by the Canadian cement industry totalled 9,125,041 barrels valued at \$14,365,237, compared with 8,368,711 barrels valued at \$13,063,588 in 1941. The output in 1942 was the largest attained since 1931 when production totalled 10,161,658 barrels worth \$15,826,243. Of the 1942 sales, 4,446,416 barrels were produced in Quebec plants; 2,784,782 barrels in Ontario; 654,855 barrels in Manitoba; 668,043 barrels in Alberta, and 571,945 barrels in British Columbia. The high and low prices per barrel in 1942 were \$2.70 and \$1.25.

The number of firms reporting commercial production of Portland cement in Canada during 1942 was 3 and the plants in operation numbered 8. Capital employed totalled \$51,121,894 and the industry distributed \$2,059,337 in salaries and wages to 1,241 employees. The total value of fuel and electricity used during the year under review amounted to \$3,127,264, of which \$2,308,873 were expended for coal and \$771,092 for purchased electricity. Process supplies consumed, including chemicals, explosives, etc., were valued at \$1,024,057.

The following tonnages of primary materials of mineral origin were used in the manufacture of the final product: limestone, 2,155,750; clay, 188,202; gypsum, 49,816; shale, 30,498; silica sand, 20,711; and iron oxide, 2,094.

The erection or expansion of plants for the production of munitions of war, the building of office structures for war-time service, and the construction of air training centres and other military projects have greatly stimulated the production of cement in Canada since the outbreak of war in 1939. A report on cement, prepared by the Bureau of Mines, Ottawa, contains the following information:

"Portland cement, the principal raw materials for which are limestone and clay, is manufactured in five provinces of Canada. In addition to the standard or ordinary variety of Portland cement, several other varieties, including high-early-strength, alkali-resistant, and white cement are made in this country, the last named variety, however, being made from imported clinker.

"Canada Cement Company, Limited, operates plants at Hull and Montreal East in Quebec; at Port Colborne and Belleville in Ontario; at Fort Whyte, Manitoba; and at Exshaw, Alberta. St. Mary's Cement Company, Limited, operates a plant at St. Mary's, Ontario. British Columbia Cement Company operates at Bamberton, British Columbia. The total rated daily capacity of all plants is about 35,000 barrels, (a barrel of cement weighs 350 pounds net).

"When the change-over from the 'dry' to the 'wet' process, now under way at the Exshaw plant of Canada Cement Company, is completed, all Canadian plants making cement from domestic raw materials will be using the wet process. Remarkable uniformity in the chemical and physical properties of the standard variety of cement is achieved throughout the country as the result of close technical control and improvements in plant equipment.

"Froth flotation is used in a number of plants in the United States and other countries to remove certain materials, principally excess silica and mica, from limestone. The successful adaptation of this process to the beneficiation of cement raw materials has permitted the utilization of limestone deposits, which, though advantageously situated, were not sufficiently pure in their natural state for cement manufacture."

Table 242.—Summary Statistics of Cement Production, Sales, etc., in Canada, 1941 and 1942

	1941		1942	
	Barrels (*)	Value	Barrels (*)	Value
		\$		\$
Output.....	8,480,957		8,634,184	
Scid or used.....	8,368,711	13,063,588	9,126,041	14,365,237
Stocks on hand December 31.....	1,365,676		873,819	
Apparent Consumption.....	8,069,824		8,875,481	

(*) 1 barrel = 350 pounds.

Table 243.—Production and Apparent Consumption of Cement in Canada, 1929-1942

Year	Sold or Used		Apparent Consumption
	Barrels	\$	Barrels
1929.....	12,284,081	19,337,235	12,105,950
1930.....	11,032,538	17,713,067	10,977,238
1931.....	10,161,658	15,826,243	10,085,986
1932.....	4,498,721	6,980,721	4,466,738
1933.....	3,007,432	4,536,935	2,974,020
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656
1937.....	6,168,971	9,095,867	6,157,485
1938.....	5,519,102	8,241,350	5,478,180
1939.....	5,731,264	8,511,211	5,501,328
1940.....	7,559,648	11,775,345	7,272,836
1941.....	8,368,711	13,063,588	8,069,824
1942.....	9,126,041	14,365,237	8,878,481

Table 244.—Producers' Sales of Cement in Canada, by Provinces, 1940-1942

Province	1940		1941		1942	
	Barrels	Value (*)	Barrels	Value (*)	Barrels	Value (*)
		\$		\$		\$
Quebec.....	3,854,339	5,432,105	4,048,749	5,798,188	4,446,416	6,487,078
Ontario.....	2,355,352	3,518,247	2,748,854	4,019,656	2,784,782	3,998,294
Manitoba.....	572,408	1,287,918	576,048	1,274,392	654,855	1,374,498
Alberta.....	414,183	852,508	492,515	985,030	668,043	1,307,353
British Columbia.....	363,366	704,567	501,945	986,322	571,945	1,198,014
Canada.....	7,559,648	11,775,345	8,368,711	13,063,588	9,126,041	14,365,237

(*) Less value of containers.

Table 245.—Number and Capacity of Kilns in Canadian Cement Plants, 1933-1942

Year	Total kilns		Kilns in use during the year	
	Number	Total capacity barrels per 24 hours	Number	Total capacity barrels per 24 hours
1933.....	41	43,622	(*)	(*)
1934.....	41	43,722	(*)	(*)
1935.....	20	32,650	(*)	(*)
1936.....	19	33,000	(*)	(*)
1937.....	18	33,900	(*)	(*)
1938.....	21	35,200	10	23,100
1939.....	21	35,000	11	23,700
1940.....	21	35,000	13	27,950
1941.....	20	33,050	16	30,350
1942.....	19	34,650	17	32,450

(*) Data not recorded.

Table 246.—Specified Materials Used in Canadian Cement Plants, 1933-1942

Year	Shale	Limestone	Gypsum	Silica sand	Clay	Iron Oxides (†)
	tons	tons	tons	tons	tons	tons
1933.....	(*)	616,364	13,319	(*)	(*)	(*)
1934.....	(*)	806,546	19,172	(*)	(*)	(*)
1935.....	(*)	818,443	21,611	5,047	(*)	(*)
1936.....	(*)	1,180,358	25,447	8,549	94,943	(*)
1937.....	(*)	1,465,168	33,691	9,281	195,877	444
1938.....	13,821	1,344,868	51,975	9,465	143,421	22
1939.....	27,241	1,379,858	31,492	7,942	105,982	16
1940.....	18,347	1,765,944	38,903	15,298	144,152	170
1941.....	26,837	2,086,781	49,031	16,110	185,954	614
1942.....	30,498	2,155,750	49,816	20,711	188,202	2,094

(*) Data not recorded. (†) Produced from iron pyrites by the chemical industry.

Table 247.—Principal Statistics of the Cement Manufacturing Industry in Canada, 1940-1942

	1940	1941	1942
Number of firms.....	3	3	3
Number of plants.....	8	8	8
Capital employed..... \$	50,370,276	51,108,294	51,121,894
Number of employees—On salary.....	83	87	89
On wages.....	969	1,148	1,152
Total.....	1,052	1,235	1,241
Salaries and wages—Salaries..... \$	191,548	190,771	200,779
Wages..... \$	1,324,218	1,670,160	1,858,558
Total..... \$	1,515,766	1,860,931	2,059,337
Selling value of products (Gross)..... \$	13,006,643	14,323,372	15,628,403
Cost of fuel and electricity..... \$	2,347,730	2,897,383	3,127,264
Cost of process supplies (*)..... \$	712,193	887,041	1,024,057
Value of containers..... \$	1,231,298	1,259,784	1,263,166
Net value of products sold..... \$	8,715,422	9,279,164	10,213,916

(*) Other than fuel and electricity.

Table 248.—Capital Employed in the Cement Industry in Canada, 1942

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land.....	9,797,282
Present value of buildings, fixtures, machinery, tools and other equipment.....	31,501,157
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	1,016,668
Inventory value of finished products on hand.....	1,120,527
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	7,686,260
Total.....	51,121,894

Table 249.—Wage-Earners on the the Last Day of Each Month, or Nearest Representative Date, 1940-1942

Month	1940	1941	1942	
			Quarry	Mill
January.....	736	1,051	146	932
February.....	711	1,058	154	938
March.....	795	1,084	150	961
April.....	874	1,169	159	989
May.....	1,021	1,177	153	988
June.....	1,041	1,219	150	1,032
July.....	1,046	1,221	154	1,058
August.....	1,052	1,177	155	1,038
September.....	1,111	1,197	148	1,040
October.....	1,146	1,158	156	993
November.....	1,100	1,145	157	1,018
December.....	923	1,124	155	973

THE CLAY AND CLAY PRODUCTS INDUSTRY

The industrial clays of Canada may be classified as common clays, stoneware clays, fireclays, and china clays. Statistically, the ceramic industry of Canada is conveniently classified into two divisions: (1) Production from domestic clays, which includes the production of building brick, structural tile, drain tile, roofing tile, stoneware, sewer pipe, pottery and refractories, and (2) production from imported clays, which includes the manufacture of electrical porcelains, sanitary ware, sewer pipe, table ware, pottery, ceramic floor and wall tile, and various kinds of fireclay refractories.

A total of 148 plants, representing in the aggregate, a capital investment of \$23,570,089, operated in the domestic and imported clay products industries in Canada during 1942. These two industries provided employment for 3,919 persons during the year; their earnings totalled \$5,123,339. The combined production in 1942 was valued at \$12,478,951 compared with \$12,947,189 in 1941.

1. PRODUCTION FROM DOMESTIC CLAYS

The gross value of Canadian producers' sales of domestic clays and products made from same totalled \$7,081,723 in 1942 compared with \$7,575,336 in 1941 and \$13,904,643, the all-time high record established in 1929. Commercial production of domestic clay products in 1942 was reported from every province except Prince Edward Island; no output of these materials has as yet been recorded for the Yukon and Northwest Territories. Of the total value of sales in 1942, Ontario and Quebec firms contributed \$2,549,486 and \$1,741,297 respectively.

Sales of building brick in 1942 totalled 169,317 thousand, valued at \$3,018,375. Sewer pipe shipments aggregated \$1,392,545; hollow blocks, roofing and floor tile, \$1,106,310; drain tile, \$329,035; and pottery, including earthenware, \$646,088.

Fireclay was mined during 1942 in Nova Scotia, Ontario, Saskatchewan, Alberta and British Columbia with sales of this material totalling 5,601 short tons valued at \$40,722. Firebrick and other fireclay products made from Canadian clays were evaluated at \$408,076. Bentonite shipments during the year under review were valued at \$44,204. Shipments of Kaolin were also reported from the province of Quebec in 1942; these totalled 408 short tons appraised at \$6,130.

The number of firms reported as active in the Canadian domestic clay products industry totalled 120 in 1942, of which 61 were located in Ontario, 19 in Quebec, 12 in Alberta, 9 in British Columbia, and the balance in Nova Scotia, New Brunswick, Saskatchewan and Manitoba. Capital employed by the industry was reported at \$17,793,931; employees numbered 2,523, and salaries and wages paid amounted to \$3,073,011. Fuel and electricity used during 1942 totalled \$1,292,373 and chemicals and various other process supplies consumed were valued at \$158,866.

Such ceramic products as glass, cement, and artificial abrasives are not included in this report.

The following information has been abstracted from a report on clay and clay products as prepared by the Bureau of Mines, Ottawa.

"Common clays suitable for the production of building brick and tile are found in all the provinces of Canada.

"The largest production in Canada of stoneware clay or semi-fireclays comes from the Eastend and Willows area, Saskatchewan. Large quantities of the clays from the area are selectively mined and shipped to Medicine Hat, Alberta, where, owing to the availability of cheap gas fuel, they are used extensively in the manufacture of stoneware, sewer pipe, pottery, tableware, etc.

"Stoneware clays and moderately refractory fireclays occur near Shubenacadie and Musquodoboit, Nova Scotia. Some of the Musquodoboit clay is used for the production of pottery, but it has not been extensively developed for ceramic use.

"Stoneware clays or low-grade fireclays occur near Williams Lake, and Chimney Creek Bridge in British Columbia; in the Cypress Hills of Alberta; and near Swan River, Manitoba; but they are difficult of access and have not been developed.

"Two large plants and a few small plants manufacture fireclay refractories from domestic clay. At one plant, about 50 miles south of Vancouver, a high-grade, moderately plastic fireclay is extracted by underground mining from the clay beds in the Sumas Mountain, and the plant manufactures firebrick and other refractory materials. Another plant at Claybank, Saskatchewan, by selective mining, utilizes the highly plastic refractory clays from the 'White Mud' beds of southern Saskatchewan.

"A small amount of the most refractory clays in the deposits near Shubenacadie is mined and used by the steel plant at Sydney, Nova Scotia, for refractory purposes and some of the Musquodoboit clay is used for stove linings. Almost all other manufacturers of fireclay refractories (including high temperature cements, plastic refractories, etc.) use imported clay.

"China clay (kaolin) has been produced commercially in Canada only from the vicinity of St. Remi d'Amherst, Papineau county, Quebec, where mining operations were carried on for several years prior to 1923. The large-scale operation of this deposit has been under consideration for a number of years and a company was organized a few years ago to extract the kaolinized material by underground mining, to refine it into high-grade china clay, and to recover washed silica sand as a by-product. Following its reorganization as Canada China Clay and Silica Products, Limited, the company constructed a modern plant and is equipped to carry out the washing process in accordance with the most up-to-date and scientific methods. The project is of special interest in view of the hazards involved in obtaining shipments of china clay from the United Kingdom for the paper, rubber, ceramic, and other industries. The Canadian production of grades of silica sand suitable for the glass trade is also of much greater importance, now that the Belgian source of supply has been cut off. Canadian Kaolin-Silica Products' property at Lac Remi, Quebec, which was operated chiefly for the production of high-grade silica sand, has been idle since the destruction of the plant by fire a few years ago.

"Several other interesting occurrences of kaolin have been discovered in Quebec in recent years. One of these, located on Thirty-One-Mile Lake, near Point Comfort, Hull county, is being explored and portions of the deposit yield china clay of a high grade in the crude state. The extent and uniformity of the deposit is not as yet proved, but its possibilities as a source of high-grade fireclay are receiving attention. Kaolin has also been discovered near Brébeuf; on Lake Labelle; and near Chateau Richer in Quebec, but there has been little exploratory work on the deposits.

"Important deposits of high-grade, plastic, white-burning and buff-burning clays occur on the Mattagami, Abitibi, and Missinabi rivers in northern Ontario. Some of these can be classed as china clays, others as fireclays, and still others as ball clays. The deposits have attracted considerable interest in recent years, but efforts to develop them have been handicapped owing to the distance of the deposits from industrial centres, and to the lack of transportation facilities.

"In British Columbia, along the Fraser river, about 25 miles above Prince George, is an extensive clay deposit, parts of which yield a high grade of china clay. As china clay from England is difficult to obtain on the West coast, owing to shipping risks, consideration is being given to the possibility of using material from this deposit as a source of china clay suitable for the pulp and paper trade.

"In the manufacture of porcelain, sanitary ware, dinner ware, ceramic floor and wall tile, etc., china clay from England has been used almost entirely. Separate production figures are not published for these classes of ceramic ware as there are only one or two producers in each case. Canada also imports large quantities of china clay for use in the production of paper; in the rubber industry; and for other industrial purposes.

"Ball clays of high bond strength occur in the 'White Mud' beds of southern Saskatchewan, but as yet they have not been developed. Activated clays for oil bleaching are largely imported. The value of such clays imported into Canada by oil refineries in 1942 was \$348,068, compared with \$321,028 in 1941. Fuller's and infusorial earths are also imported for use in sugar refineries, vegetable oil mills, etc."

Table 250.—Production (Total Sales) of Clay Products, by Provinces, 1939-1942

(Gross values)

Province	1939	1940	1941	1942
	\$	\$	\$	\$
Nova Scotia.....	339,952	490,543	529,435	618,441
New Brunswick.....	129,985	171,745	193,643	246,041
Quebec.....	1,274,776	1,546,246	1,944,358	1,741,297
Ontario.....	2,346,638	2,508,540	3,087,616	2,549,486
Manitoba.....	78,892	102,906	84,817	80,890
Saskatchewan.....	148,774	164,828	224,897	271,325
Alberta.....	461,079	838,856	952,144	1,013,497
British Columbia.....	371,140	520,883	558,426	560,746
Canada.....	5,151,236	6,344,547	7,575,336	7,051,723

Table 251.—Production (Sales) of Domestic Clay and Clay Products in Canada, 1941-1942

Product	Unit of measure	Sales or shipments			
		1941		1942	
		Quantity	\$	Quantity	\$
Clay—Bentonite.....			7,830		44,204
Fireclay.....	ton	5,431	35,475	5,601	40,722
Kaolin.....	ton	2	30	408	6,130
Other clay.....	ton	21,620	34,807	24,803	71,826
Fireclay blocks and shapes.....			190,497		210,246
Firebrick.....	M	3,643	183,897	3,816	197,830
Brick—Soft mud process—Face.....	M	14,288	285,260	11,385	233,251
Common.....	M	30,664	455,385	20,387	325,762
Stiff mud process—Face.....	M	52,419	1,218,632	39,104	872,287
(wire cut) Common.....	M	69,750	1,043,832	59,901	893,488
Brick—Dry press—Face.....	M	15,621	363,908	12,871	278,701
Common.....	M	25,449	336,097	25,145	404,730
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	36	2,100	11	676
Sewer brick.....	M	644	10,279	513	9,480
Paving brick.....	M	120	7,312	153	9,353
Structural tile—					
Hollow blocks (including fireproofing and load-bearing tile).....	ton	117,530	1,063,120	109,905	1,082,573
Roofing tile.....			750		32
Floor tile (quarries).....			21,349		23,705
Drain tile.....	M	12,319	333,364	11,659	329,035
Sewer pipe (including copings, flue linings, conduits, etc.).....			1,422,389		1,392,545
Pottery, glazed or unglazed (including coarse earthenware, sanitary ware, flower pots, and all other pottery).....			502,212		646,088
Other products.....			6,811		9,059
Total.....			7,575,336		7,081,723

In addition to the clays recorded in the above table, there were 188,202 tons of ordinary clay consumed in Canada during 1942 in the production of Portland cement; the corresponding consumption in 1941 was 185,954 tons. Also consumed by the Canadian cement industry in 1942 were 30,498 tons of shale.

Table 252.—Production of Building Brick in Canada, 1933-1942

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or orna- mental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1933.....	M	2,482	12,389	19,602	23,894	4,544	3,916	630	243	67,700
	\$	41,737	156,789	412,367	356,498	101,252	44,377	7,824	3,693	1,124,517
1934.....	M	4,904	14,256	23,800	30,317	6,005	6,440	43	307	56,072
	\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,383,929
1935.....	M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538
	\$	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167
1936.....	M	6,097	24,180	30,218	35,592	8,961	10,241	25	418	115,732
	\$	111,378	302,690	575,765	484,078	165,924	100,785	1,374	6,777	1,748,772
1937.....	M	9,904	23,636	37,610	55,689	12,565	14,136	55	175	153,770
	\$	175,544	316,534	735,615	755,630	233,542	152,662	2,972	2,777	2,375,276
1938.....	M	10,838	24,104	34,179	50,734	13,125	15,536	63	228	148,807
	\$	208,610	313,082	671,471	681,744	266,039	192,741	4,175	3,581	2,341,443
1939.....	M	10,927	26,652	45,993	51,114	12,263	17,790	68	217	165,024
	\$	182,376	372,116	941,696	692,224	242,518	236,597	4,601	4,506	2,676,634
1940.....	M	15,946	40,395	41,552	52,777	14,932	24,870	47	694	191,213
	\$	323,634	611,750	903,636	738,416	333,717	351,335	2,477	12,222	3,277,187
1941.....	M	14,288	30,664	52,419	69,750	15,621	25,449	36	644	298,871
	\$	285,260	455,385	1,218,632	1,043,832	363,908	386,097	2,100	10,279	3,765,493
1942.....	M	11,385	20,387	39,104	59,901	12,871	25,145	11	513	169,317
	\$	233,251	325,762	872,287	893,488	278,701	404,730	676	9,480	3,018,375

Table 253.—Production of Building Brick in Canada—Per Capita of Population for Years Specified

Year	M per capita	Year	M per capita
1905.....	0.087	1936.....	0.010
1914.....	0.070	1937.....	0.014
1924.....	0.033	1938.....	0.013
1929.....	0.046	1939.....	0.015
1930.....	0.031	1940.....	0.017
1933.....	0.006	1941.....	0.018
1944.....	0.008	1942.....	0.014
1945.....	0.032		

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Table 254.—Production of Paving Brick in Canada, 1933-1942

Year	Quantity	Value
	M	\$
1933.....	1	42
1934.....	10	352
1935.....	15	627
1936.....	116	3,149
1937.....	3	131
1938.....	1	34
1939.....	157	6,089
1940.....	19	819
1941.....	120	7,312
1942.....	153	9,353

Table 255.—Production of Structural Tile in Canada, 1933-1942

Year	Hollow Blocks(*)		Roofing Tile		Floor Tile (Quarries)	
	Short tons	\$	No.	\$	Sq.ft.	\$
1933.....	26,747	160,059	20,469	1,136	91,495	14,297
1934.....	31,136	244,122	44,115	1,852	80,356	17,491
1935.....	47,195	344,608	82,015	3,669	51,765	7,629
1936.....	58,501	467,860	52,730	2,139	97,738	13,798
1937.....	64,526	533,843	60,542	3,302	73,191	12,169
1938.....	70,648	591,416	150,504	5,195	100,958	15,330
1939.....	86,120	714,291	148,291	4,964	90,812	15,233
1940.....	105,073	788,478	41,772	1,839	(b)	13,631
1941.....	117,530	1,063,120	(b)	750	(b)	21,349
1942.....	109,905	1,082,573	(b)	32	(b)	23,705

(*) Including fireproofing and load-bearing tile.

(a) In addition, there was produced \$615 worth of ceramic tile.

(b) Data not available.

Table 256.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1933-1942

Year	Value	Year	Value
	\$		\$
1933.....	354,458	1938.....	778,107
1934.....	436,433	1939.....	813,208
1935.....	481,559	1940.....	1,152,603
1936.....	588,485	1941.....	1,422,389
1937.....	790,210	1942.....	1,392,545

Table 257.—Production of Drain Tile in Canada, 1933-1942

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1933.....	10,057	222,829	1938.....	12,862	322,774
1934.....	7,385	180,553	1939.....	14,361	353,973
1935.....	7,124	205,336	1940.....	10,550	277,551
1936.....	8,148	214,549	1941.....	12,319	333,364
1937.....	11,391	298,970	1942.....	11,659	329,085

Table 258.—Production of Pottery† from Domestic Clays in Canada, 1933-1942

Year	Value	Year	Value
	\$		\$
1933.....	202,500	1938.....	235,890
1934.....	213,733	1939.....	*280,420
1935.....	220,711	1940.....	474,452
1936.....	218,402	1941.....	502,212
1937.....	232,209	1942.....	646,088

†Including coarse earthenware, stoneware, flower pots, and all other pottery.

*In addition \$2,292 worth of sanitary ware was produced.

Table 259.—Production of Kaolin* and Fireclay in Canada, 1933-1942

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1933.....			1,421	11,273	1938.....			2,344	17,243
1934.....	48	504	1,043	12,598	1939.....			10,045	30,824
1935.....	170	1,520	2,272	15,574	1940.....			4,881	30,564
1936.....			2,437	17,639	1941.....	2	30	5,431	35,475
1937.....			4,123	26,081	1942.....	408	6,130	5,601	40,722

*Produced in the province of Quebec.

Table 260.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1933-1942

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1933.....	1,547	73,226	80,625	1938.....	2,213	113,581	73,512
1934.....	2,109	101,219	62,388	1939.....	2,331	119,346	95,256
1935.....	1,817	90,149	71,344	1940.....	3,167	165,525	85,127
1936.....	2,538	118,923	65,171	1941.....	3,643	183,897	190,497
1937.....	2,950	142,827	75,431	1942.....	3,816	197,830	210,246

Table 261.—Production (Sales) of Bentonite in Canada, by Provinces, 1933-1942

Year	Bentonite							
	Manitoba		Alberta		British Columbia		Canada	
	tons	\$	tons	\$	tons	\$	tons	\$
1933.....					55	1,363	55	1,363
1934.....					63	1,578	63	1,578
1935.....					41	781	41	781
1936.....					(a) 120	180	(a) 120	180
1937.....	132	1,154			31	817	163	1,971
1938.....			1,136	3,444	43	215	1,179	3,659
1939.....	99	591	889	2,850			988	3,441
1940.....	710	2,023	714	2,240	45	225	1,469	4,488
1941.....	760	1,330	1,317	5,882	95	618	2,172	7,830
1942.....		38,800		5,404				44,204

(a) Partly for experimental purposes.

BENTONITE

(Bureau of Mines, Ottawa)

Bentonite, mainly of the highly-colloidal, "swelling" variety, is widely distributed over large areas of the Prairie Provinces, where it occurs at several horizons in Upper Cretaceous sediments. The more important known deposits are exposed mainly in areas dissected by drainage channels where they show as beds in the slopes bordering valleys and in the sides or on top of small buttes in typical "bad-land" topography. Thus, many of the chief exposures are found in the Red Deer Valley section of Alberta; over a wide area in southern Saskatchewan; and in the district around Morden, in southern Manitoba. One lower-lying bed occurs as a persistent parting in the No. 1 or main coal seam mined at a number of points in the Drumheller district, Alberta, as well as near Cluny, farther east. Other exposures exist in the Edmonton region, Alberta, and farther west, on McLeod River, near Edson. In British Columbia, a deposit of unusual thickness occurs in Tertiary beds near Merritt and at Princeton.

Several of the above occurrences have been mined on a small scale, but the total production to date is comparatively small. Most of the output has come from the Drumheller area in the Red Deer Valley, Alberta, and from the Morden area, Manitoba.

Gordon L. Kidd of Drumheller, who commenced operations in 1937, reported shipments in 1942, most of which went to Alberta Mud Company, 502 Lancaster Building, Calgary, for processing and use in oil drilling in the Turner Valley field. Aetna Coal Company, East Coulee, south of Drumheller, supplied bentonite to Mineral Sales Limited, of Calgary, the material being shipped to Lethbridge and Okotoks, also for oil drilling use. Total production by Drumheller and district producers to the end of 1942 is about 5,500 tons.

In Manitoba, Pembina Mountain Clays Limited, 915 Paris Building, Winnipeg, which commenced operations in 1940, continued development of its deposits near Morden in the southern part of the province and reported 1,650 tons of clay mined. Part of this was processed in the company's plant at Winnipeg and marketed as foundry clay and bleaching clay. Most of the foundry clay has gone to local foundries, and the bleaching clay is used in oil refining and in the packing house trade. The bentonite of the Morden district possesses high bleaching power in the natural state, and the company installed an activation unit in 1942. Tests in the Bureau of Mines Laboratories at Ottawa have shown that for foundry use Morden bentonite is equal, if not superior, to the bentonite imported for this purpose from the United States.

No world figures of bentonite production are available. The United States supplies and uses most of the output; its exports have included ground natural clay for foundry and other uses, and activated clay for bleaching.

Bentonite prices in the United States have been showing a downward trend and the nationwide average level in 1941 declined to \$6.93 per ton f.o.b. mines, from \$7.65 in 1940. Price average of the colloidal-type Wyoming material dropped from \$10.65 to \$9.39 in the same period. Trade journal quotations, however, have remained substantially unchanged. Wyoming dried and granulated clay sold in 1942 for \$6.50 per ton, f.o.b. mines, in carload lots, and air-floated 200-mesh material for \$9.50 bagged. Selected air-floated Wyoming clay was priced at \$26 per ton, f.o.b. Chicago. Freight rates from Wyoming points to Montreal are about \$14 per ton. Imported activated (Filtrol-type) bentonite has cost \$75 to \$80 per ton, in carload lots, delivered eastern Canadian points, while American natural bleaching clay has sold for \$25 per ton laid down.

Table 262.—Fuller's Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1932-1942

Year	Petroleum products industry		Soaps and washing compounds	
	*pounds	\$	pounds	\$
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	230,357	508,316	6,562
1935.....	18,487,148	260,885	660,018	13,694
1936.....	18,907,295	243,164	1,328,219	20,601
1937.....	18,843,458	240,309	1,167,768	20,393
1938.....	19,687,467	281,668	1,195,208	19,375
1939.....	19,814,473	304,214	1,586,163	30,924
1940.....	23,828,660	406,185	1,651,471	40,695
1941.....	30,155,750	571,010	1,486,000	39,332
1942.....	24,162,091	528,350	1,350,000	37,831

*Includes all clays.

Table 263.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1931-1942

Year	Tons	Value	Year	Tons	Value
		\$			\$
1931.....	11,484	173,660	1937.....	41,738	578,223
1932.....	14,432	205,068	1938.....	34,968	488,147
1933.....	20,048	267,014	1939.....	32,769	430,092
1934.....	27,550	357,286	1940.....	36,931	558,659
1935.....	33,766	422,584	1941.....	32,844	588,585
1936.....	39,165	520,121	1942.....	28,734	578,190

Table 264.—Clays and Earths Used in Canadian Rubber Goods Industry, 1933-1942

Year	Tons	Value	Year	Tons	Value
		\$			\$
1933.....	1,391	32,361	1938.....	2,942	81,935
1934.....	2,391	54,368	1939.....	3,438	80,745
1935.....	2,639	63,553	1940.....	3,588	90,867
1936.....	3,017	70,709	1941.....	4,059	101,441
1937.....	3,614	79,300	1942.....	1,523	37,186

Table 265.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and Their Products in Canada, 1932-1942

Year	Firebrick		Fireclay		Other Fireclay, Firebrick and Cupola Blocks
	Number	Value	Tons	Value	
		\$		\$	\$
1932.....	3,409,000	123,532	5,910	52,492	36,395
1933.....	1,846,016	141,784	7,615	62,602 (b)	11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	23,064
1936.....	(a)	(a)	(c) \$ 779,014	(a)	(a)
1937.....	(a)	(a)	(c) \$1,058,787	(a)	(a)
1938.....	(a)	(a)	(c) \$ 838,012	(a)	(a)
1939.....	(a)	(a)	(c) \$ 939,495	(a)	(a)
1940.....	(a)	(a)	(c) \$1,597,898	(a)	(a)
1941.....	(a)	(a)	(c) \$2,581,813	(a)	(a)
1942.....	(a)	(a)	(c) \$3,268,181	(a)	(a)

(a) Not published separately.

(b) From 1933 includes only cupola blocks.

(c) Combined value for firebrick, fireclay and other fireclay, firebrick and cupola blocks.

Table 266.—Fuller's and Infusorial Earth Used in Specified Canadian Industries, 1933-1942

Year	Sugar Refineries		Vegetable Oil Mills	
	Pounds	\$	Pounds	\$
1933.....	(a)	(a)	126,880	2,730
1934.....	(a)	(a)	115,120	2,171
1935.....	(a)	(a)	88,950	2,425
1936.....	(b)	59,200	143,720	10,044
1937.....	(c)	4,586,786	95,532 (x)	9,349
1938.....	(c)	4,908,597	101,473	9,063
1939.....	(c)	4,819,811	105,711 (b)	10,166
1940.....	(c)	4,984,362	112,369 (b)	7,731
1941.....	(c)	5,333,131	133,129 (b)	10,604
1942.....	(c)	3,007,180	75,295 (b)	20,154

(a) Not recorded.

(b) Fuller's earth, in 1942, includes 97,785 pounds clarex earth valued at \$4,657.

(c) Infusorial earth.

(x) Includes other earth.

NOTE.—In addition to the consumption recorded, there is a considerable quantity of fuller's earth used by the slaughtering industry.

PRICES (a)

Bentonite.—per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$7.50; pulverized, 200 mesh, \$9.50 in 100-lb. paper bags.

China Clay (Kaolin)—per ton, f.o.b. South Carolina and Georgia mines, in bulk: saggar clays, \$2.50 to \$3.50; tailings, \$1.50 to \$5.00. No. 2 grades, \$5.50 to \$6.00; No. 1 grades, air-floated, crude, \$6.75 to \$8.00; No. 1 washed, \$8.00. Florida: washed, crushed, bulk, \$11.75; air-floated and washed, \$14 to \$15. Maryland: ball clays, shredded bulk, \$3.00 to \$7.00; air-floated, in paper bags, \$10.10 to \$18.25; New Jersey: plastic kaolin, pulverized, in paper bags, \$10.25 to \$10.75. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, C and F. American ports: lump, \$26 to \$28 in bulk; air-floated \$40 to \$60 nominal.

Fuller's Earth—per ton, f.o.b. Colorado, \$9; f.o.b. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up, \$7.

(b) **Fuller's Earth**—English, long ton, nominal; Georgian, carlots, long ton \$27.78.

China Clay.—Imported, carlots, bulk, ton \$25 to \$50 (U.S. only). Pigment clay for rubber, carlots, bags, ton \$23.00 less carlots, ton, \$26.50. Kaolin—nominal, (refined grades), cwt. \$1.80, specially refined 10 cents a pound.

(a) "Engineering & Mining Journal's Metal & Mineral Markets"—New York, November, 1942 and July, 1943.

(b) F.O.B. market at Toronto—"Canadian Chemistry & Process Industries"—Toronto, December, 1942 and June, 1943.

Table 267.—Capital Employed in the Clay Products Industry in Canada, by Provinces, 1942

Industry and province	Capital employed as represented by:					Total
	Present value of land†	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
		\$	\$	\$	\$	\$
By INDUSTRIES—						
*Brick and Tile—						
Nova Scotia.....	113,107	573,798	24,479	25,361	138,882	875,627
New Brunswick.....	19,568	153,394	981	12,250	13,270	199,463
Quebec.....	800,270	2,284,976	96,878	348,106	692,953	4,223,183
Ontario.....	1,281,892	4,217,485	153,092	490,824	1,967,428	8,110,721
Manitoba.....	14,000	38,361	5,500	8,292	89,555	155,708
Saskatchewan.....	259,945	411,405	20,849	44,220	80,508	816,927
Alberta.....	119,455	1,364,535	212,616	104,684	175,532	1,976,822
British Columbia.....	139,674	387,091	10,897	125,346	160,044	823,052
Total for Canada.....	2,747,911	9,431,045	525,292	1,159,083	3,318,172	17,181,503
Stoneware and pottery—						
Total for Canada.....	40,169	344,626	13,315	57,594	156,724	612,428
By PROVINCES—						
Total for clay and clay products—						
Nova Scotia.....	113,107	573,798	24,479	25,361	138,882	875,627
New Brunswick.....	25,760	165,579	4,201	20,979	19,381	235,900
Quebec.....	801,470	2,295,776	97,678	348,906	694,453	4,238,283
Ontario.....	1,283,892	4,237,485	154,092	495,114	1,987,117	8,167,700
Manitoba.....	14,000	38,361	5,500	8,292	89,555	155,708
Saskatchewan.....	259,945	411,405	20,849	44,220	80,508	816,927
Alberta.....	140,232	1,666,176	220,911	148,459	304,956	2,480,734
British Columbia.....	139,674	387,091	10,897	125,346	160,044	823,052
Canada.....	2,788,080	9,775,671	538,607	1,216,677	3,474,896	17,793,931

*Clay, sewer pipe, firebrick products and other clays included under brick and tile.

†Excluding unmined material.

Table 268.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1942

Province	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries and wages		
	Male	Female	Male	Female		Salaries	Wages	Total
						\$	\$	\$
Nova Scotia.....	9	4	194	.....	207	38,461	165,315	203,776
New Brunswick.....	7	3	76	17	103	11,632	67,089	78,721
Quebec.....	49	7	485	.....	541	139,247	595,264	734,511
Ontario.....	94	26	755	5	880	241,888	943,205	1,185,093
Manitoba.....	9	2	43	1	55	20,134	40,127	60,261
Saskatchewan.....	12	.....	46	.....	58	20,375	61,310	81,685
Alberta.....	29	7	295	137	468	71,165	359,499	430,664
British Columbia.....	18	5	188	.....	211	47,643	250,657	298,300
Canada.....	227	54	2,082	160	2,523	590,545	2,482,466	3,073,011

*See note, page 96.

Table 269.—Average Number of Wage-Earners, by Months, 1940-1942

Month	1940	1941	1942		
			Pit	Plant	
				Male	Female
January	1,190	1,907	143	1,683	140
February	1,051	1,792	115	1,559	137
March	1,287	1,871	123	1,563	143
April	1,739	2,427	161	1,797	148
May	2,647	3,250	241	1,987	154
June	3,143	3,369	258	2,166	146
July	3,191	3,281	248	2,176	164
August	3,027	3,070	227	2,158	175
September	2,812	2,869	182	2,042	165
October	2,530	2,628	162	1,979	185
November	2,300	2,424	148	1,900	170
December	2,151	2,153	128	1,637	155

II. PRODUCTS FROM IMPORTED CLAYS

This industry covers the operations of Canadian plants which were occupied chiefly in making ceramic products from imported clays. Products made in these plants during 1942 included high tension insulators, vitreous china sanitary ware, china dinnerware, firebrick, sewer pipe, floor and wall tile, refractory cements, electrical porcelains, etc.

Twenty-four plants reported in this group for 1942 and their output was valued at \$5,397,228 against last year's total of \$5,371,853 and the 1940 figure of \$4,503,791. Capital employed amounted to \$5,776,158. The average number of workers was 1,396 and payments for salaries and wages totalled \$2,050,238. Fuel and electricity cost \$386,969 and materials for use in manufacturing processes cost \$1,170,938.

Table 270.—Products Made in the Imported Clay Products Industry, 1941 and 1942

Product	1941	1942
	Gross selling value at works	Gross selling value at works
Firebrick and stove linings—		
Rigid	\$ 661,035	\$ 1,138,761
Plastic	193,098	213,712
High temperature cements	105,467	131,478
High tension porcelain insulators, china sanitary ware, clay sewer pipe, floor and wall tile, pottery, china tableware, etc. (separate figures cannot be shown for these items as there were only one or two producers in each case)	4,411,660	3,913,277
Total	5,371,853	5,397,228

Table 271.—Materials Used in the Imported Clay Products Industry, 1941 and 1942

Material	1941		1942	
	Short tons	Total cost at works	Short tons	Total cost at works
Imported clays—Ball clay	3,746	\$ 71,966	2,614	\$ 53,881
China clay	3,504	76,768	3,344	80,003
Fireclay	39,423	277,448	35,391	249,635
Sagger clay	976	16,008	847	14,347
Other imported clays	1,161	20,820	733	16,848
Canadian clays—Fireclay	2	20	28	1,615
Other clays	215	1,669	164	836
Feldspar	3,333	74,247	2,799	62,525
Silica and ground quartz	4,055	63,116	3,753	63,259
Talc	762	11,542	565	7,774
Other glazing materials		37,742		24,401
Insulator hardware		230,375		125,062
Shipping containers and packing materials		149,739		109,255
All other materials		301,148		360,897
Total		1,331,608		1,170,938

LIME INDUSTRY

Production of quick and hydrated lime in Canada during 1942 totalled 884,830 net tons valued at \$6,530,839 compared with 860,885 net tons worth \$6,357,941 in 1941. The output in 1942 comprised 749,282 net tons of quicklime valued at \$5,646,049 and 135,548 net tons of hydrated lime at \$884,790. During the year under review, 712,307 net tons of quicklime and 89,252 net tons of hydrated lime were sold or used by lime producers for chemical manufacture, while the balance of Canadian lime production, totalling 83,271 net tons was sold or used for building, agricultural and other purposes.

Stone used in the production of lime in Canada includes calcium, high calcium and dolomitic varieties of limestone. It is estimated that about 1,574,508 net tons of limestone were consumed in the production of lime in 1942. In 1942 lime was produced in all Canadian provinces with the exception of Prince Edward Island and Saskatchewan; no commercial production of lime in the Territories has ever been officially reported. Of the total Canadian output of lime in 1942, Ontario plants produced 415,698 net tons or approximately 47 per cent, and Quebec 348,576 net tons or 39.4 per cent. Data relating to Canadian imports and exports of lime are not available for publication during the war, and such information is supplied only for confidential use by the External Trade Branch of the Dominion Bureau of Statistics, Ottawa.

During 1942 the industry reported 48 plants as active; capital employed totalled \$4,742,066, and \$1,312,320 in salaries and wages were distributed to 1,022 employees. The cost of fuels and purchased electricity used amounted to \$2,421,292 and the value of explosives, chemicals and other process supplies consumed aggregated \$177,268.

Lime is marketed in the form of quicklime and in the hydrated state, the latter being specially prepared slaked lime in the form of a fine powder that is usually marketed in 50-pound, multi-wall paper bags.

Quicklime is marketed in the lump, pebble, crushed and pulverized forms; lump lime and pebble lime are sold either in bulk or packed in barrels; crushed lime (1 inch and under) and pulverized lime (ground to minus 20 mesh, and in some plants to minus 50 mesh) are sold in airtight multi-wall paper bags.

Prices of the various lime products vary over a wide range depending on the geographical position of the plants and on differences in quality of the lime.

A review of lime in 1942 by the Bureau of Mines, Ottawa, contains the following information:

"The steadily increasing demand for lime by the war industries has raised production above all previous records, and most of the forty-eight plants throughout the country operated at capacity during 1942. A new source of hydrated lime became available in 1942 with the coming into operation of the magnesia plant of the Aluminum Company of Canada, Limited, at Wakefield, Quebec. At this plant hydrated lime is produced as a co-product of magnesia. The large rotary-kiln lime plant of Shawinigan Chemicals Limited, at Shawinigan Falls, Quebec was enlarged in 1942 by the addition of two kilns.

"There are many prospective lime-producing localities in Canada because of the abundance of suitable limestone throughout the country. With the northward development of the mining industry, considerable interest is being manifested in making lime from limestone deposits in the far north."

Table 272.—Production of Lime in Canada, by Provinces, 1942, Showing Purposes for Which Used (*) or Sold

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Total Canada
(1 ton = 2,000 pounds)						
QUICKLIME						
Building trades—						
Finishing lime.....ton		50	2,500	2,495		5,045
\$		437	15,500	22,598		38,535
Masons' lime.....ton	2,760	4,894	9,401	644		17,699
\$	25,315	60,919	83,760	7,121		177,115
Sand-lime brick.....ton		1,599	4,274			5,873
\$		7,838	33,261			41,099
Agriculture.....ton	100	130	75			305
\$	838	1,970	562			3,370
CHEMICAL—						
Smelters (non-ferrous).....ton		10,559	6,671	3,282	25	20,537
\$		70,532	41,569	26,296	187	138,584
Iron and steel furnaces (†).....ton	23,700	5,985	24,337	760	105	54,937
\$	241,744	52,138	176,034	6,080	786	476,782
Cyanide and flotation mills.....ton		2,473	10,772	7,800	507	21,552
\$		17,548	70,204	70,938	3,797	162,487
Pulp and paper mills.....ton	10,874	106,394	6,223	11,473	20,659	155,623
\$	96,990	695,292	42,423	85,321	164,606	1,084,632
Glass works.....ton			15,745	51		15,796
\$			106,659	563		107,222
Sugar refineries.....ton	107	30	6,924	9,593	45	16,699
\$	963	420	59,086	79,518	337	140,324
Tanneries.....ton		1,214	3,697			4,911
\$		10,648	25,263			35,911
Fertilizer plants.....ton			349			349
\$			2,663			2,663
Insecticide plants.....ton			1,607	90	135	1,832
\$			11,127	1,105	1,011	13,243
Other chemical works.....ton	216	128,103	289,782	1,970		420,071
\$	2,811	1,043,682	2,091,502	14,810		3,152,805
Uses unspecified.....ton		1,890	260	1,402	4,501	8,053
\$		20,111	2,030	15,422	33,714	71,277
Total Quicklime.....ton	37,757	263,321	352,667	39,560	25,977	749,282
\$	368,661	1,981,535	2,761,643	329,772	204,438	5,646,049
HYDRATED LIME—						
Building trades—						
Finishing lime.....ton	85	16	16,653	5,233		21,987
\$	700	96	206,536	86,547		293,879
Masons' lime.....ton	843	2,911	7,863			11,617
\$	7,289	19,610	70,516			97,415
Sand-lime brick.....ton						
\$						
Agriculture.....ton	872	533	3,137		3,769	8,311
\$	7,820	3,474	31,865		24,197	67,356
CHEMICAL—						
Smelters (non-ferrous).....ton		59,585	91	42	355	60,073
\$		186,320	835	420	2,279	189,854
Iron and steel furnaces.....ton			50			50
\$			505			505
Cyanide and flotation mills.....ton		5,267	811	310		6,388
\$		22,640	8,627	3,100		34,367
Pulp and paper mills.....ton	4,375	5,172	353		45	9,945
\$	35,000	43,928	3,770		289	82,987
Glass works.....ton			8			8
\$			79			79
Sugar refineries.....ton	35	30	87			152
\$	315	285	939			1,539
Tanneries.....ton		431	571			1,002
\$		3,664	6,072			9,736
Fertilizer plants.....ton		110	176			286
\$		660	1,542			2,202
Insecticide plants.....ton	310		24		122	456
\$	4,030		232		783	5,045
Other chemical works.....ton		7,995	2,797	100		10,892
\$		30,807	28,688	1,000		60,495
Uses unspecified.....ton		3,205	410		766	4,381
\$		30,688	3,725		4,918	39,331
Total Hydrated Lime.....ton	6,520	85,255	33,031	5,685	5,057	135,548
\$	55,154	342,172	363,931	91,067	32,466	884,790
Grand Total.....ton	44,277	348,576	415,698	45,245	31,034	884,830
\$	423,815	2,323,707	3,125,574	420,839	236,904	6,530,849

(*) Not necessarily consumed in provinces where produced.

(†) Includes calcined dolomite used as a refractory material.

NOTE.—Of the total quantity of 884,830 tons of lime produced, 413,948 tons were consumed by the producers themselves.

Table 273.—Lime Sold or Used for Chemical and Other Purposes in Canada, 1931-1942

Year	Lime sold or used for chemical purposes				Lime sold or used for building or other non-chemical purposes			
	Quicklime		Hydrated Lime		Quicklime		Hydrated Lime	
	Short tons	\$	Short tons	\$	Short tons	\$	Short tons	\$
1931.....	213,782	1,469,434	18,055	167,885	65,726	595,550	47,222	531,546
1932.....	234,342	1,627,720	21,130	131,178	33,926	287,795	31,252	347,844
1933.....	207,463	1,496,271	28,347	168,675	60,464	459,451	27,266	307,909
1934.....	201,609	1,440,221	28,297	158,685	106,513	798,035	31,694	348,856
1935.....	229,597	1,596,518	31,288	179,139	112,450	828,904	32,084	321,230
1936.....	349,940	2,499,074	39,384	171,192	41,559	290,898	37,518	374,806
1937.....	421,867	2,922,482	44,929	189,665	44,671	329,901	37,886	382,869
1938.....	373,278	2,587,329	30,547	159,598	42,483	365,762	40,614	429,963
1939.....	424,287	2,887,244	30,861	172,062	50,466	439,403	46,595	504,805
1940.....	568,479	3,944,748	44,421	256,570	55,324	477,010	48,506	516,227
1941.....	665,319	4,797,078	86,202	496,531	58,545	490,633	50,819	573,699
1942.....	712,307	5,314,653	89,252	386,809	36,975	331,396	46,296	497,981

Table 274.—Number of Firms, Employees, Salaries and Wages and Net Value of Lime (Quick and Hydrated) Sold or Used, by Provinces, 1942

Province	Number of firms	Number of employees		Salaries and wages	Fuel, electricity and process supplies used	Production Net value
		Salaried employees	Wage-earners			
New Brunswick (†).....	6	8	130	\$ 181,751	\$ 99,172	\$ 324,643
Quebec.....	14	25	374	440,289	1,432,111	891,596
Ontario.....	14	32	232	435,265	857,242	2,268,332
Manitoba.....	4	6	89	99,626	109,212	155,867
Alberta.....	4	7	39	70,036	45,934	109,826
British Columbia.....	2	20	60	85,353	54,889	182,015
Canada.....	44	98	924	1,312,320	2,598,560	3,932,279

(†) Includes data for two firms operating in Nova Scotia.

Table 275.—Capital Employed in the Lime Industry in Canada, by Provinces, 1942

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of stone on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
New Brunswick (*).....	25,500	116,742	\$ 11,318	\$ 3,168	\$ 47,507	\$ 204,235
Quebec.....	20,650	487,553	203,662	10,245	255,648	977,758
Ontario.....	111,216	1,821,232	332,612	14,089	39,711	2,318,860
Manitoba.....	.....	498,791	26,487	9,144	.....	534,422
Alberta.....	2,500	187,868	11,500	3,900	39,220	241,988
British Columbia.....	5,000	309,588	67,186	5,466	74,563	461,893
Canada.....	164,866	3,421,774	652,765	46,012	456,649	4,742,066

(*) Includes data for 2 firms in Nova Scotia.

Table 276.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1939-1942

Month	1939		1940		1941		1942	
	Quarry	Kiln	Quarry	Kiln	Quarry	Kiln	Quarry	Kiln
January.....	274	450	275	440	300	605	285	628
February.....	252	449	271	463	319	630	297	619
March.....	300	489	274	297	343	656	314	647
April.....	340	492	316	530	350	665	311	640
May.....	366	539	366	563	375	668	318	643
June.....	370	522	370	554	368	674	331	637
July.....	362	539	390	590	379	705	327	633
August.....	369	538	372	596	372	666	307	604
September.....	359	549	365	582	375	660	299	587
October.....	351	585	378	594	373	674	261	631
November.....	347	539	328	597	365	659	271	614
December.....	310	471	326	536	333	631	272	590

THE SAND-LIME BRICK INDUSTRY

Five plants in Canada were engaged chiefly in making sand-lime building brick during 1942. Four of these were located in Ontario and 1 in Quebec. Production, including some cement blocks and brick, was valued at \$303,762, a decrease of 29 per cent from the 1941 total of \$431,359.

Capital invested in these works amounted to \$357,140. An average of 93 people were employed and they were paid \$120,039 in salaries and wages. Expenditures for fuel and electricity amounted to \$30,318, and for processing materials to \$99,724.

Production of sand-lime brick amounted to 12,472 M valued at \$169,716, a decline in both quantity and value from the output of 19,223 M brick at \$230,030 in the previous year. Production value of sand-lime building blocks dropped to \$30,691 from \$46,665.

Table 277.—Products Made, 1941 and 1942

		1941		1942	
		Quantity	Selling value at works	Quantity	Selling value at works
Sand-lime brick.....	M	19,223	\$ 230,030	13,472	\$ 169,716
Sand-lime building blocks.....	M		46,665	213	30,691
Other products (*).....			154,664		103,355
Total.....			431,359		303,762

(*) Includes cement blocks, cinder blocks and insulating brick.

Table 278.—Materials Used in Manufacturing, 1941 and 1942

Material	Unit of measure	1941		1942	
		Quantity	Cost at works	Quantity	Cost at works
Portland cement.....	brl.	13,175	\$ 26,550	7,949	\$ 17,295
Quicklime.....	ton	5,157	41,674	3,518	29,037
Sand and gravel.....	cu.yd.	60,973	47,647	36,206	35,756
Cinders.....	cu.yd.	8,614	7,466	4,964	4,080
Other materials.....			19,605		13,556
Total.....			142,942		99,724

SAND AND GRAVEL INDUSTRY

Commercial production of sand and gravel in Canada during 1942 totalled 26,349,907 short tons valued at \$9,005,414 compared with 31,604,806 short tons worth \$10,375,723 in 1941. Included in the totals for both years are sands and gravels from all sources, including recoveries by dredges and material used by railroads as ballast and by mines as backfill.

Quebec and Ontario are Canada's largest sand and gravel producing provinces, the output in these provinces in 1942 being, respectively, 11,026,249 short tons and 8,420,358 short tons; in 1942, the quantity of material washed or screened at Canadian sand and gravel plants totalled 3,656,889 short tons compared with 4,458,426 short tons in 1941, while the quantity of bank or pit-run grades amounted to 22,693,018 short tons as against a corresponding tonnage of 27,146,380 in the preceding year.

Of the total sand and gravel output in 1942, there were 16,139,859 short tons used for concrete, roads, etc., and 1,610,333 short tons as railroad ballast. In addition, there were produced 2,535,366 short tons of straight-run sand for building, etc., 35,807 short tons for moulding; 2,694 short tons as core sand and 54,029 short tons for other purposes. The quantity of crushed gravel produced during the year under review amounted to 2,135,072 short tons and 836,757 short tons of sand were employed as mine fill.

Firms (including individuals) reported as active in the Canadian sand and gravel industry numbered 1,419 in 1942; of these, 800 were located in Quebec, 554 in Ontario, 26 in British Columbia and lesser numbers in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta. Capital employed by the industry totalled \$4,477,547; employees were reported at 2,141; salaries and wages paid totalled \$2,404,755; fuel, electricity and process supplies used aggregated \$677,149 and the total net value of production was estimated at \$8,328,265.

The following information has been abstracted from a report prepared by the Bureau of Mines, Ottawa:

"Deposits of gravel and sand are numerous throughout Eastern Canada, with the exception of Prince Edward Island where gravels are scarce. Owing to the widespread occurrence of gravels and sands and to their bulk in relation to value, local needs for these materials are usually supplied from the nearest deposits, as their cost to the consumer is governed largely by the length of haul; hence the large number of small pits and the small number of large plants. Some grades of sand particularly suitable for certain industries command a much higher price than does ordinary sand.

"Road improvement, concrete works and railway ballast absorb by far the greater part of the gravel and sand used. Gravel in particular has proved a good material for building all-weather roads at low cost and its use has steadily increased with the growth of motor traffic.

"A considerable tonnage of sand and gravel is also used in the mines for re-filling underground workings. Some mines used several thousand tons a day.

"Most of the gravel used for road work comes from pits worked for that purpose. Usually a portable or semi-portable plant is used to extract enough gravel to supply the immediate need and then a sufficient reserve is built up, in the form of stock piles, for two years' requirements. Road pits may remain idle for two years or more. The amount of gravel produced from year to year thus fluctuates, depending on the program of road construction and improvement. Intermittent operation also applies to railway pits, which may remain idle for several years.

"Part of the gravel used is crushed, screened and in some cases even washed, and the proportion thus processed is increasing steadily. Some Provincial Highway Departments have used crushed instead of pit-run gravel on their main highways for a number of years. Most of the large commercial plants are equipped for producing crushed gravel, a product that can compete with crushed stone.

"The amount of sand consumed follows the trend of building activity, as most of it is used in the building industry for concrete work, cement and lime mortar, or wall plaster. The sand must be clean, that is, free from dust, loam, organic matter, or clay, and contain but little silt, and is usually obtainable from local deposits."

Prices of sand, gravel and crushed stone in the four largest cities in Canada were as follows, at the end of 1941 and 1942. Prices per ton or cubic yard, as indicated below, are for carlots f.o.b. cars:

	Montreal		Toronto		Winnipeg		Vancouver	
	per ton		per ton		per cu.yd.		per cu.yd.	
	1941	1942	1941	1942	1941	1942	1941	1942
Sand.....	\$ 1.15	\$ 1.15	\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00
Gravel.....	1.10	1.10	1.53	1.56	1.60	1.00	1.00	1.00
Crushed stone.....	0.82	0.93	1.61	1.67	.....	.....	1.13	1.10

Every province except New Brunswick and Prince Edward Island produces natural bonded moulding sand. One deposit in New Brunswick was operated in 1918 and another in 1921 and 1922. A small production also came from Prince Edward Island of a grade suitable only for light-weight castings. By far the greater part of the output has come from the Niagara peninsula, Ontario. Occasionally new deposits have been opened up, mostly in Ontario and in the western provinces.

The results of a general investigation of moulding sands in Canada were published in 1936 by the Bureau of Mines, Ottawa, in the form of report No. 767, "Natural Bonded Moulding Sands of Canada." This report directs attention to the large number of deposits from which supplies have been obtained for local foundries and the probability of replacing imported material with Canadian sands.

Small quantities of moulding sands not tabulated in official records are produced in nearly all the provinces by foundrymen for their own use from nearby deposits; or by part time operators, such as farmers, for local foundries.

The industry is seasonal in nature as foundrymen usually obtain their supplies in the summer and autumn.

Table 279.—Production in Canada of Sand and Gravel, by Kinds, 1941 and 1942

		Washed or screened	Bank or pit run	Total value
		tons	tons	\$
PRODUCTION (*)—	1941			
Sand—				
Moulding sand.....		25,624	12,685	40,066
Building sand and sand for concrete, roadwork, etc.....		1,305,256	887,149	729,901
Core sand.....		37,468	73	17,680
Mine filling.....			1,363,317	190,504
Other sand (including blast sands, engine sands, etc.).....		7,485	84,533	26,054
Sand and Gravel—				
Sand and gravel for railway ballast.....		340,005	4,496,903	916,979
Sand and gravel for concrete, road-building, etc.....		2,194,901	17,574,897	7,135,255
Crushed gravel.....		547,687	2,726,823	1,319,281
Total.....		4,458,426	27,146,380	10,375,723
Cost of fuel, electricity and process supplies used.....				474,647
Total net value.....				9,901,076
PRODUCTION (*)—	1942			
Sand—				
Moulding sand.....		25,753	10,054	41,825
Building sand and sand for concrete, roadwork, etc.....		1,617,886	917,480	934,777
Core sand.....		2,434	240	3,670
Mine filling.....			836,757	147,602
Other sand (including blast sands, engine sands, etc.).....		2,727	51,302	12,534
Sand and Gravel—				
Sand and gravel for railway ballast.....		275,814	4,334,509	957,781
Sand and gravel for concrete, road-building, etc.....		1,342,011	14,797,848	6,010,412
Crushed gravel.....		390,244	1,744,828	806,813
Total.....		3,656,889	22,693,018	9,005,414
Cost of fuel, electricity and process supplies used.....				677,149
Total net value.....				8,328,265

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these is recorded under quartz in the bulletin—The Feldspar and Quartz Mining Industry.

Table 280.—Production of Sand and Gravel in Canada, by Railway Operators, 1941 and 1942

Kind	1941		1942	
	Tons	Value	Tons	Value
		\$		\$
Sand—				
Moulding sand.....	225	450	300	600
Building sand and sand for concrete, roads, etc.....	121	45	1,350	150
Other sand (including blast and engine sands).....	74,819	15,423	45,517	7,645
Sand and gravel—				
Sand and gravel for railway ballast.....	4,238,565	688,920	3,821,861	742,668
Sand and gravel for concrete, roads, etc.....	304,394	62,309	140,285	25,049
Crushed gravel.....	132,957	54,642	128,125	68,717
Total.....	4,751,081	821,789	4,137,438	844,829

Table 281.—Production of Sand and Gravel in Canada, by Operators, Other Than Railways, 1941 and 1942

Kind	1941			1942		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	Tons	Tons	\$	Tons	Tons	\$
Sand—						
Moulding sand.....	25,624	12,460	39,616	25,753	9,754	41,225
Building sand and sand for concrete, roads, etc.....	1,305,256	887,028	729,856	1,617,886	916,130	934,627
Core sand.....	37,468	73	17,680	2,454	240	3,670
Other sand (including blast and engine sands).....	7,485	9,714	10,631	2,727	5,785	4,889
Sand and gravel—						
Sand and gravel for railway ballast.....	340,005	258,338	228,059	275,814	512,648	215,113
Sand and gravel for concrete, roads, etc.....	2,194,901	17,270,503	7,072,949	1,342,011	14,657,563	5,985,363
Mine filling.....		1,363,317	190,504		836,757	147,602
Crushed gravel.....	547,687	2,593,866	1,264,639	390,244	1,600,703	825,096
Total.....	4,458,426	22,395,299	9,553,934	3,656,889	18,555,580	8,160,585

Table 282.—Production of Sand for Building and Concrete, Roads, etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, etc., 1933-1942

Year	SAND		SAND AND GRAVEL			
	For building, concrete, roads, etc.		For railway ballast		For concrete roads, etc.	
	Tons	\$	Tons	\$	Tons	\$
1933.....	775,412	218,559	561,538	110,449	9,957,832	3,907,911
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937.....	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764
1938.....	1,750,187	685,976	2,359,703	443,936	22,513,256	9,101,882
1939.....	1,169,899	364,829	3,223,718	603,288	22,899,751	8,988,114
1940.....	1,961,604	537,937	3,834,904	699,518	21,465,961	9,100,612
1941.....	2,192,405	729,901	4,836,908	916,979	19,769,798	7,135,258
1942—						
Nova Scotia.....			186,646	33,898	496,067	274,393
New Brunswick.....	40	18	241,411	74,656	681,569	465,867
Quebec.....	1,351,372	371,870	1,136,286	210,841	6,942,225	1,310,935
Ontario.....	1,040,482	492,108	1,673,027	391,239	4,541,580	2,217,155
Manitoba.....	19,508	8,489	614,913	119,735	707,418	251,134
Saskatchewan.....	135	15	163,903	25,698	481,235	403,512
Alberta.....	23,781	25,023	194,852	29,575	261,990	164,079
British Columbia.....	100,048	37,254	399,285	72,139	2,027,775	923,337
Canada.....	2,535,366	934,777	4,610,323	957,781	16,139,859	6,010,412

Table 283.—Production of Sand and Gravel in Canada, by Provinces, 1942

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Sand—								
Moulding sand.....tons	1,118			33,349	1,295	18	27	
\$	3,275			37,147	1,837	36	30	
Building sand and sand for concrete, roadwork, etc.....tons		40	1,351,372	1,040,482	19,508	135	23,781	100,048
\$		18	371,870	492,108	8,489	15	25,023	37,254
Core sand.....tons				2,454	240			
\$				3,492	178			
Other sand (including blast sand, engine sand, etc.).....tons			1,080	15,655		33,060	994	3,240
\$			270	4,074		5,693	207	2,290
Sand and gravel—								
Sand and gravel for railway ballast.....tons	186,646	241,411	1,136,286	1,673,027	614,913	163,903	194,852	399,285
\$	33,898	74,656	210,841	391,239	119,735	25,698	29,575	72,139
Sand and gravel for concrete, roads, etc.....tons	496,067	681,569	6,942,225	4,541,580	707,418	481,235	261,990	2,027,775
\$	274,393	465,867	1,310,935	2,217,155	251,134	403,512	164,079	923,337
Mine filling.....tons				836,757				
\$				147,602				
Crushed gravel.....tons	91,964		1,595,286	277,054	99,627	1,628		69,513
\$	60,404		591,937	141,169	46,277	544		56,182
Total.....tons	775,795	923,020	11,026,249	8,420,358	1,443,001	679,979	481,644	2,599,861
Gross value.....\$	371,970	540,541	2,485,853	3,433,986	427,150	435,798	218,914	1,091,202

Table 284.—Capital Employed in the Sand and Gravel Industry in Canada, by Provinces, 1942

	Capital employed as represented by:					Total
	Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	\$ (a)	\$ (a)	\$ (a)	\$ (a)	\$ (a)	\$ (a)
Nova Scotia.....						
New Brunswick.....	5,000	30,000			5,000	40,000
Quebec.....	89,880	92,228	7,648	100	30,958	220,814
Ontario.....	140,614	968,967	38,420	69,093	703,632	1,920,726
Manitoba.....	351,709	153,479	83,233	2,211	219,432	810,064
Saskatchewan.....	3,000	1,500			500	5,000
Alberta.....	15,600	25,915	500	1,000	19,744	62,759
British Columbia.....	740,791	560,163	8,861	1,612	106,757	1,418,184
Canada.....	1,346,504	1,832,252	138,662	74,016	1,086,023	4,477,547

* Excluding unmined materials.

(a) Not available.

† Includes value of dredges.

Table 285.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces, 1942

Province	Average number of employees			Salaries and wages		
	Salaried Employees	Wage-earners	Total	Salaries	Wages	Total
Nova Scotia.....	1	227	228	\$ 250	\$ 121,541	\$ 121,791
New Brunswick.....		146	146		77,277	77,277
Quebec.....	26	859	885	30,892	957,795	988,687
Ontario.....	29	340	369	65,963	427,199	493,162
Manitoba.....	28	238	266	62,834	280,175	343,009
Saskatchewan.....	1	27	28	100	46,364	46,464
Alberta.....	4	60	64	24,000	83,334	107,334
British Columbia.....	24	131	155	40,829	186,202	227,031
Canada.....	113	2,028	2,141	224,868	2,179,887	2,404,755

Table 286.—Average Number of Wage-Earners, in the Sand and Gravel Industry, by Months, 1941 and 1942

	1941	1942
January.....	450	369
February.....	440	434
March.....	517	524
April.....	815	782
May.....	4,400	3,796
June.....	8,493	5,352
July.....	8,023	4,787
August.....	7,225	3,183
September.....	3,421	1,835
October.....	2,570	1,142
November.....	764	954
December.....	412	528

THE STONE INDUSTRY IN CANADA

The Stone Industry in Canada comprises two main divisions: 1. The Stone Quarrying Industry, including quarries and dressing works operated in conjunction with quarries, and 2. The Stone Products Industry, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the Stone Products Industry are included under manufactures. For convenience, this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$14,895,507 in 1942. Production during the year totalled \$11,114,999, which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1942 numbered 3,622 and their combined earnings amounted to \$4,721,645.

The two industries are treated separately in the following review:

1. PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (traprock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

The gross value of all varieties of stone produced in Canada during 1942 totalled \$8,746,594 compared with \$8,000,684 in 1941. Comprising the tonnage shipped in 1942 were 6,442,583 tons of limestone valued at \$6,468,525; 1,366,425 tons of granite (igneous rocks) valued at \$1,946,249; 153,865 tons of sandstone valued at \$226,810; 13,824 tons of marble valued at \$88,209, and 1,369 tons of slate worth \$16,801. Of the total value of domestic stone produced in 1942, quarries in the province of Quebec contributed 47.6 per cent, Ontario 34.1 per cent, and British Columbia 4.5 per cent.

The number of firms in the stone quarrying industry reported as active in 1942 totalled 412; capital employed amounted to \$10,988,011; employees numbered 2,697; salaries and wages paid aggregated \$3,454,263, and the cost of fuel, electricity and process supplies used was reported at \$1,517,169.

Table 287.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1941 and 1942

Province	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1941						
Nova Scotia..... tons	410	46,973		66,219		113,602
\$	30,537	69,501		169,307		269,345
New Brunswick..... tons	1,529	131,941		4,678		138,148
\$	63,184	274,000		10,680		347,864
Quebec..... tons	316,372	3,370,875	10,809	76,928	346	3,775,330
\$	866,182	2,567,422	92,916	82,701	346	3,609,567
Ontario..... tons	152,426	3,353,856	6,540	13,420		3,526,242
\$	388,325	2,832,056	30,365	27,190		3,277,936
Manitoba..... tons	244	38,103				38,347
\$	4,155	60,743				64,898
Alberta..... tons		7,942				7,942
\$		24,303				24,303
British Columbia..... tons	129,941	201,359	300	8,640	950	341,190
\$	146,403	229,702	2,800	15,650	12,216	406,771
Canada..... tons	600,922	7,151,049	17,649	169,885	1,296	7,940,801
\$	1,498,786	6,057,727	126,081	305,528	12,562	8,000,684
1942						
Nova Scotia..... tons	429	185,232		43,856		229,517
\$	41,985	645,680		76,502		764,167
New Brunswick..... tons	964	82,623		4,350		87,937
\$	29,334	281,296		10,650		321,280
Quebec..... tons	1,178,765	2,926,964	9,429	72,894	158	4,188,210
\$	1,449,840	2,565,029	58,714	92,724	158	4,166,465
Ontario..... tons	90,530	2,992,885	4,295	18,835		3,106,545
\$	288,828	2,636,431	27,675	33,004		2,985,938
Manitoba..... tons	133	43,355				43,488
\$	2,452	69,514				71,966
Alberta..... tons		12,028				12,028
\$		40,436				40,436
British Columbia..... tons	95,604	199,496	100	13,930	1,211	310,341
\$	133,810	230,139	1,820	13,930	16,643	396,342
Canada..... tons	1,366,425	6,442,583	13,824	153,865	1,369	7,978,066
\$	1,946,249	6,468,525	88,209	226,810	16,801	8,746,594

(a) All igneous rocks included.

(b) Includes dolomite, also marl for agricultural purposes.

NOTE.—Not included in the above limestone statistics are 2,155,750 tons of limestone consumed in the cement industry in 1942 and 2,086,781 tons in 1941. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 1,574,508 tons of limestone were burned in the manufacture of lime in 1942 and 1,530,200 tons in 1941.

Table 288.—Production (Sales) of Stone from Canadian Quarries, by Provinces, Showing Purposes for Which Used, 1942 (*)

For use as follows:	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
1942								
Building stone—Rough.....	tons 333	32	10,616	3,070			1,633	15,684
\$	2,709	480	33,024	15,905			3,398	55,516
Dressed.....	tons 690		5,088	2,475	960			9,213
\$		30,978	180,125	78,062	17,100			306,265
Monumental and ornamental	tons 30	126	5,663	53			1,039	6,911
stone—Rough.....	\$ 300	4,092	83,867	1,349			10,752	100,360
Dressed.....	tons 399		3,188		188		270	4,045
\$	41,685		269,088		5,002		45,197	360,972
Flagstone.....	tons 10		22	1,081				1,265
\$		50	62	5,677	850			6,639
Curbstone.....	tons		5,571					5,571
\$			28,781					28,781
Paving blocks.....	tons		2,008	25				2,033
\$			12,776	280				13,056
Lining open-hearth furnaces.....	tons			20,311				20,311
\$				15,238				15,238
Chemical—								
Flux in iron and steel furnaces.....	tons 143,054	6	2,138	428,752	4,813	1,849	761	581,373
\$	556,544	9	1,817	346,460	8,149	4,947	2,315	920,241
Flux in non-ferrous smelters.....	tons		91	115,895			62,051	178,037
\$			209	83,991			38,842	123,042
Glass factories.....	tons		1,177			3,358		4,535
\$			5,483			4,197		9,680
Manufactured magnesium.....	tons			5,267				5,267
\$				3,051				3,051
Pulp and paper mills.....	tons 3,142	6,339	116,095	31,414	1,892		49,112	207,994
\$	12,792	14,034	146,544	85,368	2,081		70,114	330,333
Sugar refineries.....	tons	28		12,175	7,753			19,956
\$		133		10,554	10,840			21,527
Other chemical uses.....	tons		726	243,383			40	244,149
\$			1,274	244,925			360	246,559
Pulverized Stone—								
Whiting (substitute).....	tons			3,635			307	3,942
\$				19,998			3,684	23,682
Asphalt filler.....	tons 575		7,063	4,452			1,455	13,545
\$	4,600		28,792	15,041			8,180	56,613
Dusting coal mines.....	tons					1,347	351	1,698
\$						5,388	2,369	7,757
Agricultural purposes and	tons 30,768	71,025	154,958	22,203	1,518	1,950	3,762	286,184
fertilizer plants.....	\$ 63,615	261,664	243,064	48,755	1,897	7,800	14,405	641,200
Other uses.....	tons		30	7,741	1,938	91	20	9,820
\$			150	24,790	1,806	364	220	27,330
Crushed stone for manufacture of								
artificial stone.....	tons		127	239				366
\$			618	952				1,570
Roofing granules.....	tons			35,512			842	36,354
\$				182,541			13,512	196,053
Poultry grit.....	tons		1,166	3,197	110	3,430	898	8,801
\$			4,938	19,245	880	17,680	3,866	46,009
Stucco dash.....	tons		873			81	3	869
\$			5,353			355	60	10,240
Terrazzo chips.....	tons		1,584	1,372				2,956
\$			8,989	9,206				18,195
Rock wool.....	tons			9,942				9,942
\$				9,799				9,799
Rubble and riprap.....	tons 4,495	7,764	286,896	82,722	290		30,361	412,528
\$	6,607	6,532	198,473	91,942	390		26,330	330,274
Crushed stone—								
Concrete aggregate.....	tons 26,769	1,680	2,488,006	406,889			1,393	2,924,737
\$	44,789	2,840	2,030,117	345,257			1,254	2,424,357
Road metal.....	tons 19,952	237	902,109	1,191,873	20,288		141,247	2,275,706
\$	30,526	368	737,687	962,326	19,192		127,374	1,877,473
Railroad ballast.....	tons		193,015	472,867	3,505		13,930	683,317
\$			145,234	365,226	3,424		13,930	527,814
Total Canada.....	tons 229,517	87,937	4,188,210	3,106,545	43,488	12,028	310,341	7,978,066
 \$	764,167	321,280	4,166,465	2,985,938	71,966	40,436	396,342	8,746,594
Per cent of total.....	Quantity	2.88	1.10	52.50	38.94	0.55	0.15	3.88
Value		8.74	3.67	47.64	34.14	0.82	0.46	4.53

(*) Includes the production of slate and marl.

Table 289.—Production (Sales) of Stone from Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1941 and 1942

For use as follows:	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1941						
Building stone—Rough..... tons	2,589	15,687	61	1,902		20,239
..... \$	11,248	36,557	3,036	9,584		60,425
Dressed..... tons	13,772	19,455	422	374		34,023
..... \$	284,803	241,298	51,535	15,016		592,652
Monumental and ornamental stone—						
Rough..... tons	7,260	148	24			7,432
..... \$	81,073	434	798			82,305
Dressed..... tons	4,925	52		20		4,997
..... \$	291,643	2,339		400		294,382
Flagstone..... tons	150	1,459		927		2,536
..... \$	336	2,625		5,474		8,435
Curbstone..... tons	3,379	70		31		3,480
..... \$	14,483	42		207		14,732
Paving blocks..... tons	2,106					2,106
..... \$	16,931					16,931
Lining open-hearth furnaces..... tons		29,124				29,124
..... \$		20,893				20,893
Chemical—						
Flux in iron and steel furnaces..... tons		254,998				254,998
..... \$		222,916				222,916
Flux in non-ferrous smelters..... tons		275,918				275,918
..... \$		178,543				178,543
Glass factories..... tons		2,605	899			3,504
..... \$		3,256	3,428			6,684
Pulp and paper mills..... tons		240,031	334			240,365
..... \$		305,023	668			305,691
Sugar refineries..... tons		6,219				6,219
..... \$		8,024				8,024
Other chemical uses..... tons		184,686				184,686
..... \$		167,716				167,716
Pulverized Stone—						
Whiting (substitute)..... tons		5,481				5,481
..... \$		31,907				31,907
Asphalt filler..... tons		18,463	5,240		63	24,191
..... \$	1,635	62,089	9,956		504	74,184
Dusting coal mines..... tons		1,894				1,894
..... \$		8,472				8,472
Agricultural purposes and fertilizer plants..... tons		216,657	480			217,137
..... \$		453,548	840			454,388
Other uses..... tons		12,871	837			13,708
..... \$		37,278	4,267			41,545
Crushed stone for manufacture of artificial stone—						
..... tons			862			862
..... \$			3,711			3,711
Roofing granules..... tons	14,274	887				16,048
..... \$	143,328	2,405				157,445
Poultry grit..... tons	2	3,912	2,195		11,712	6,109
..... \$	90	16,397	10,909			27,396
Stucco dash..... tons	5	2,697	1,412			4,114
..... \$	115	14,958	9,018			24,091
Terrazzo chips..... tons		896	4,131			5,027
..... \$		2,688	26,049			28,737
Rock wool..... tons		8,313				8,313
..... \$		8,339				8,339
Rubble and riprap..... tons	118,328	414,827	410	47,678	346	581,559
..... \$	85,212	232,741	1,638	47,236	346	367,173
Crushed stone—						
Concrete aggregate..... tons	178,611	2,350,850		52,122		2,581,583
..... \$	214,956	1,648,057		123,213		1,986,226
Road metal..... tons	254,171	2,647,797	342	56,303		2,958,613
..... \$	352,378	2,038,208	228	93,579		2,484,393
Railroad ballast..... tons	925	435,052		10,528		446,505
..... \$	555	310,974		10,819		322,348
Total Canada..... tons						
..... \$	600,922	7,151,049	17,649	169,885	1,296	7,940,801
	1,498,786	6,657,727	126,081	365,528	12,562	8,000,684

Table 289.—Production (Sales) of Stone from Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1941 and 1942—Concluded

For use as follows:	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1942						
Building stone—Rough..... tons	2,354	11,818	214	1,298		15,684
..... \$	12,540	25,250	10,692	7,034		55,516
Dressed..... tons	2,497	6,230	146	340		9,213
..... \$	108,807	169,382	19,476	8,600		306,265
Monumental and ornamental stone—						
Rough..... tons	6,858		53			6,911
..... \$	99,011		1,349			100,360
Dressed..... tons	3,827	218				4,045
..... \$	356,459	4,513				360,972
Flagstone..... tons		223		1,042		1,265
..... \$		1,276		5,363		6,639
Curbstone..... tons	5,571					5,571
..... \$	28,781					28,781
Paving blocks..... tons	2,008			25		2,033
..... \$	12,776			280		13,056
Lining open-hearth furnaces..... tons		20,311				20,311
..... \$		15,238				15,238
Chemical—						
Flux in iron and steel furnaces..... tons		581,373				581,373
..... \$		920,241				920,241
Flux in non-ferrous smelters..... tons		178,037				178,037
..... \$		123,042				123,042
Glass factories..... tons		3,358	1,177			4,535
..... \$		4,197	5,483			9,680
Manufacture of magnesium..... tons		5,267				5,267
..... \$		3,051				3,051
Pulp and paper mills..... tons		207,994				207,994
..... \$		330,933				330,933
Sugar refineries..... tons		19,956				19,956
..... \$		21,527				21,527
Other chemical uses..... tons		236,812	1	7,336		244,149
..... \$		237,681	5	8,873		246,559
Pulverized Stone—						
Whiting (substitute)..... tons		3,942				3,942
..... \$		23,682				23,682
Asphalt filler..... tons		13,494			51	13,545
..... \$		56,205			408	56,613
Dusting coal mines..... tons		1,698				1,698
..... \$		7,757				7,757
Agricultural purposes and fertilizer plants..... tons		285,924	20		240	286,184
..... \$		639,182	98		1,920	641,200
Other uses..... tons		9,570	250			9,820
..... \$		25,960	1,370			27,330
Crushed stone for manufacture of artificial stone..... tons						
..... \$		239	127			366
..... \$		952	618			1,570
Roofing granules..... tons	35,204	310			840	36,354
..... \$	181,352	1,240	3,445		13,461	196,053
Poultry grit..... tons	3	5,325	953		27	8,501
..... \$	70	26,433	19,732		324	46,609
Stucco dash..... tons	6	814	553		53	1,326
..... \$	80	8,445	6,953		530	16,008
Terrazzo chips..... tons		443	2,513			2,956
..... \$		1,329	16,806			18,135
Rock wool..... tons		9,942				9,942
..... \$		9,799				9,799
Rubble and riprap..... tons	83,966	289,188	4,925	34,291	158	412,528
..... \$	51,201	234,940	5,517	38,458	158	330,274
Crushed stone—						
Concrete aggregate..... tons	1,051,168	1,818,625		54,944		2,924,737
..... \$	897,444	1,444,013		82,900		2,424,357
Road metal..... tons	171,228	2,063,819		40,659		2,275,706
..... \$	196,102	1,619,999		61,372		1,877,473
Railroad ballast..... tons	1,735	667,652		13,930		683,317
..... \$	1,626	512,258		13,930		527,814
Total Canada (b)..... tons	1,366,425	6,442,583	13,821	153,865	1,369	7,978,066
..... \$	1,946,249	6,468,525	88,209	226,810	16,801	8,746,594

(a) Includes all igneous rock.

(b) Does not include limestone used in Canadian lime and cement industries but includes marl used for agricultural purposes.

GRANITE

Table 290.—Production of Granite (*) in Canada, 1933-1942

Year	Short tons	\$	Year	Short tons	\$
1933.....	256,723	679,585	1938.....	705,307	1,379,417
1934.....	200,285	781,739	1939.....	1,102,395	2,119,501
1935.....	326,354	1,126,287	1940.....	1,147,747	1,884,410
1936.....	941,743	1,319,313	1941.....	600,922	1,498,786
1937.....	1,135,099	1,827,433	1942.....	1,366,425	1,946,249

(*) Includes all igneous rock.

The following abstracts are from a report on granite prepared by the Bureau of Mines, Ottawa:

"The stone quarried in this industry consists of granite and related crystalline igneous rocks used for building, decorative, ornamental, or constructional purposes. Producing properties are situated in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia. Large areas in Canada are underlain by granite, and the prospects of finding stone suitable for its various uses are good.

"The industry in the Maritime Provinces was comparatively quiet in 1942. No new deposits were opened and production came from the well-established firms.

"Quebec furnishes most of the granite for building, the Stanstead, St. Samuel, Lake St. John, and Rivière-à-Pierre districts being the leading producers. The low ebb of building construction during the past few years has seriously affected this branch of the industry. The Silver Granite Company continued its operations in the Lake St. John district. Material from quarries in Quebec was made use of in the past few years in a number of Canada's public buildings, including the Supreme Court Building, Ottawa, the Ottawa Post Office, and several structures in British Columbia. It was also used in the construction of the T. Eaton Company's stores in Port Arthur and Edmonton.

"A red granite of medium to coarse texture and of a uniform mixture has recently been developed near Coe Hill, Ontario, by Upper Canada Granite Quarries, Limited, and this deposit was being exploited with a view to supplying the domestic and export markets for monumental and building stock. It has been closed for the duration.

"Prospecting for granite deposits suitable for building and monumental use has been active in Manitoba, and several deposits of red granite of various shades have been located, but so far little development has taken place.

"Granite for monumental use is produced in the Maritime Provinces and in Quebec, Ontario, Manitoba, and British Columbia, and is finding a small but steadily increasing market. Early in 1939 an appreciable amount of foreign stone, principally of the black and red varieties, was imported mainly from Finland and Sweden, but this source of supply is now cut off. Black granite has been quarried in Canada, notably in the vicinity of Lake St. John, Quebec, and from quarries along the north shore of Lake Superior, and stone from these areas should find a ready market for monumental use. Other deposits of 'black granite' in the Maritime Provinces, Quebec, Ontario, and Manitoba show promise of yielding stone of good quality.

"Granite is used for building purposes mainly in large buildings, such as public and semi-public structures and institutions.

"Much of the granite produced in Canada is used for foundations for highways; for the permanent ballasting of railway roadbeds; for heavy aggregate in large concrete structures; for the filling of breakwaters; and for bridge piers. The market curtailment of such operations during the past several years has seriously affected production. Production is far below the record years.

"Some granite is being imported from the United States for monumental use, but these imports are likely in time to be replaced by Canadian material. The demand for stone for monumental use varies, and a variety which has enjoyed a steady market for a number of years may later be completely superseded by another variety. At present, the so-called 'black granite' and the 'grey' varieties seem to be in most demand for monuments, although the various shades of reds are still popular in many districts.

"Now that shipments from the Scandinavian countries to the United States and to Canada have been discontinued, Canadian producers would be well advised to give careful study to the market possibilities of a monumental stock, especially for the black and red varieties.

"In the building trade, coloured granites are being used to an increasing extent in the form of thin polished slabs for trim for buildings in which the main colour scheme calls for contrast.

"Canadian granites are suitable for all the purposes for which granite is used, and with persistent advertising there is no reason why this industry should not have a flourishing future."

LIMESTONE

Table 291.—Production of Limestone (*) in Canada, 1933-1942

Year	Short tons	\$	Year	Short tons	\$
1933.....	2,572,911	2,142,516	1938.....	4,288,507	3,864,619
1934.....	3,747,779	3,157,832	1939.....	4,149,589	3,817,551
1935.....	3,631,665	3,253,573	1940.....	6,108,591	5,126,075
1936.....	3,731,548	3,143,872	1941.....	7,151,049	6,057,727
1937.....	5,542,806	4,673,942	1942.....	6,442,583	6,468,525

(*) Includes dolomite and marl; production of marl in 1942 totalled 23,026 tons.

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Limestone is available in great bedded formations and in massive highly metamorphosed deposits, the former being much more common and yielding most of the production. At present almost all Canadian limestone is won by open pit methods, though underground mining of the rock has been adopted by several companies producing limestone for chemical and metallurgical uses and for making lime. Underground mining will undoubtedly become more common, particularly for the production of high-grade stone for chemical use, as the readily accessible parts of deposits become worked out.

"Of significance in connection with future production of pure limestone is the progress being made in beneficiation, whereby siliceous material is in part removed from limestone by flotation. This method of purifying limestone is now in use at several Portland cement plants in various parts of the world.

"For domestic use limestone is marketed in a variety of forms ranging from huge squared blocks of dimension stone used in construction, to extremely fine dust used chiefly as a mineral filler. Some of the products are processed little if at all from the condition in which the rock is obtained from the quarry (as for example limestone used in the wood pulp industry), but the bulk of the output is crushed and screened for use as road metal, concrete aggregate, railroad ballast, and as flux in metallurgical plants. Large quantities are used in the manufacture of Portland cement, lime, and various chemical products. Argillaceous dolomite is used in the manufacture of rock wool.

"Pure dolomite is now an important source of magnesia and magnesium metal. In the calcined state it is used for precipitating magnesia from sea water and from magnesium chloride brines, the magnesia content of the dolomite itself being recovered at the same time. It is also the raw material in several processes in which the magnesia of the dolomite alone is recovered. The magnesia so obtained may be used for the making of magnesium metal as well as for various other purposes for which magnesia is used. Magnesium metal is also recovered directly from calcined dolomite by reduction with ferrosilicon.

"A use for limestone that is capable of enormous development is in agriculture. Though the necessity of applying limestone or lime to agricultural land in order to maintain or increase soil fertility has been emphasized for many years by authorities on agriculture, the quantity so used in Canada is still very small, whereas if the proper quantity were applied it would constitute one of the principal outlets for limestone.

"Limestone in blocks of large dimensions for sawing into building stone is quarried in Quebec, Ontario, and Manitoba. In Quebec, quarries at St. Marc des Carrières, Portneuf county, produce grey limestone, and several in and near Montreal yield limestone of similar colour. In Ontario, two quarries near Queenston in the Niagara peninsula yield silver-grey limestone as well as small quantities of buff and of variegated buff and grey. At Longford Mills, near Orillia, buff, silver-grey, and brown limestone for use as marble and as building stone is available, but has not been quarried for the past several years. The Manitoba quarries are near Tyndall and yield mottled buff, mottled grey, and mottled variegated limestone. Besides these large quarries, the products of which have a wide shipping range, small quarries producing building stone for local use are worked near Quebec City, Montreal, and Hull in Quebec; and at Ottawa, Kingston, and Warton in Ontario. Rubble is their chief product.

"Some of the quarry companies market stone in all stages of manufacture, from the mill block to elaborately carved material; others sell stone only in the mill block. Waste material is utilized for crushed stone, rubble, riprap, flagging, chemical and metallurgical purposes, and for lime manufacture.

"There were no developments of importance in 1942. Although building construction is active owing to defence needs, most of the buildings are of the factory type and require little cut stone; thus, the building-stone industry is relatively inactive and a number of the quarries are either shut down or operated only for a short time each year.

"The limestone deposits being worked for building stone are favourably situated in respect to centres of population and the supply of stone is adequate for present and future demands.

"Prices of limestone in the mill block f.o.b. quarry have remained almost stationary in recent years, and range from 50 cents to \$1 per cubic foot, depending on the size of block and grade of stone."

MARBLE

Table 292.—Production of Marble in Canada, 1933-1942

Year	Short tons	\$	Year	Short tons	\$
1933.....	10,897	65,913	1938.....	19,375	87,274
1934.....	13,783	69,475	1939.....	14,124	200,054
1935.....	15,975	85,369	1940.....	13,739	75,409
1936.....	22,866	169,698	1941.....	17,649	126,081
1937.....	21,642	88,595	1942.....	13,824	88,209

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Marble quarries are operated in Quebec, Ontario, Manitoba, and British Columbia. The products include squared blocks for sawing into slabs and for making monuments, and broken marble for rubble and for making terrazzo, stucco dash, whitening substitute, marble flour and artificial stone. Waste from some of the quarries is sold for chemical uses and for road metal.

"In Quebec, several varieties of clouded grey marble and also a black marble are quarried at Philipsburg by Missisquoi Stone and Marble Company, Limited. Some brown marble used for counters and wainscoting is obtained from the building stone quarries in the Trenton limestones at St. Marc des Carrières, Portneuf county. Dolomitic white marble is quarried and crushed by White Grit Company at Portage de Fort, Pontiac county, and by Canada Marble and Lime Company, l'Annonciation, Labelle county, for the making of terrazzo chips, stucco dash, poultry grit, artificial stone, and for chemical and ceramic uses. A small quantity of dark red marble has been quarried at Cap St. Martin near Montreal, chiefly for making tombstones.

"In Ontario, black marble in beds up to 40 inches thick is quarried at St. Albert, near Ottawa, by Silverstone Black Marble Quarries, Limited. White marble is quarried at Marmora by Bonter Marble and Calcium Company, Limited, and at Haliburton by Bolander Brothers for making terrazzo chips, poultry grit, stucco dash, and artificial stone. Buff, red, white, green, and black marbles are quarried north of Madoc by Karl Stockloser and by Connolly Marble, Mosaic and Tile Company, Limited for use as terrazzo.

"In Manitoba, a number of highly coloured marbles are available, but there is only a small production to supply terrazzo chips and building rubble.

"In British Columbia there are many deposits of marble, but there is only a small production of white marble near Victoria and on Texada Island for use as terrazzo, poultry grit, marble sand, and whiting substitute.

"Many known deposits of beautifully coloured marbles have never been fully investigated chiefly because the present demand in Canada for marble of any one colour, other than for a staple variety, such as white, is comparatively small.

"The war has adversely affected the Canadian marble industry, for though construction activity is again at a high level, most of the buildings erected are of the industrial type in which little or no standing marble is used.

"The Canadian market calls for interior decorative marble almost entirely, and very little is used for the exteriors of buildings. A considerable quantity is, however, used for tombstones.

"There is a wide range in the price of marble depending on quality and rareness of colouring, but these prices are as a rule governed by those of European marbles of similar kind, most of which, in peacetime, enjoy a world-wide market, whereas the markets for marble produced on this continent are mostly domestic."

SANDSTONE

Table 293.—Production of Sandstone in Canada, 1933-1942

Year	Short tons	\$	Year	Short tons	\$
1933.....	99,043	108,562	1938.....	101,854	218,405
1934.....	115,169	143,283	1939.....	176,265	331,830
1935.....	342,824	838,005	1940.....	176,475	305,543
1936.....	285,508	495,856	1941.....	169,885	305,528
1937.....	235,165	343,871	1942.....	153,865	236,810

Canadian sandstone has been utilized extensively in the construction of many important public buildings in Canada and is finding increasing favour as a material in the construction of the better type home. The rock occurs in Canada in a variety of colours, including white, reddish brown, yellow and grey. Shipments of sandstone were made in 1942 from quarries located in all of the provinces with the exception of Prince Edward Island, Manitoba and Saskatchewan.

The greater part of the crude output in 1942 was employed as rubble and riprap and in the crushed state for concrete, highway construction and railroad ballasting. Sandstone in British Columbia, New Brunswick and Nova Scotia has been employed in the manufacture of abrasive wheels and sharpening stones; such production is included with natural abrasives manufacture. Crude, crushed or ground quartzite sold for fluxing purposes or as silica sand is included under quartz as production.

SLATE

Table 294.—Production of Slate in Canada, 1933-1942

Year	Short tons	\$	Year	Short tons	\$
1933.....	250	3,750	1938.....	979	6,311
1934.....	738	4,802	1939.....	1,149	6,760
1935.....	1,129	4,329	1940.....	1,113	7,522
1936.....	1,247	5,414	1941.....	1,296	12,562
1937.....	900	5,519	1942.....	1,369	16,801

Canadian slate production in 1942 came entirely from the provinces of Quebec and British Columbia and represented shipments of the stone in the form of granules for roofing purposes, riprap and asphalt filling. No Canadian deposits of slate suitable for the production of high grade roofing slates or shingles have been reported as being under development in recent years.

Table 295.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1934-1942

	Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture
1934.....	tons 52,665	489,580	821,099	2,062,487	345,802	806,546
	\$ 490,095	447,429	608,240	1,668,927	209,296	.....
1935.....	tons 200,899	537,799	804,719	1,976,363	351,302	818,443
	\$ 1,258,741	483,709	523,847	1,987,351	211,993	.....
1936.....	tons 42,335	615,207	1,014,145	1,908,927	784,081	1,180,358
	\$ 714,616	553,597	730,617	1,653,134	659,658	.....
1937.....	tons 49,098	693,947	1,497,655	3,169,136	642,248 (c)	1,465,168
	\$ 746,370	626,297	1,214,181	2,522,080	570,606	.....
1938.....	tons 97,336	551,737	981,739	2,721,922	86,019	1,358,689
	\$ 725,402	468,000	791,971	2,347,010	58,816	.....
1939.....	tons 71,288	577,278	1,344,636	2,131,306	600,266	1,407,099
	\$ 1,344,340	523,579	1,109,028	1,773,337	522,882	.....
1940.....	tons 97,336	725,685	2,673,078	2,300,613	896,408	1,784,291
	\$ 722,514	681,796	2,171,487	1,885,744	741,772	.....
1941.....	tons 54,262	965,690	2,581,583	2,958,613	446,505	2,113,618
	\$ 653,077	889,574	1,986,226	2,484,393	322,348	.....
1942.....	tons 24,897	1,236,044	2,924,737	2,275,706	683,317	2,186,248
	\$ 361,781	1,651,982	2,424,357	1,877,473	527,814	.....

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

(c) Includes shale. (Includes 13,821 tons shale in 1938; 27,241 tons in 1939; 18,347 in 1940; 26,837 in 1941 and 30,498 in 1942.

WHITING SUBSTITUTE

(Bureau of Mines, Ottawa)

Whiting substitute, as the name implies, is a material that may be used in place of chalk whiting, all of which originates in England or in Europe. It may be made from white limestone or white marble, marl, lime, or the waste calcium carbonate sludge resulting from the manufacture of caustic soda.

The products made from white marble or white limestone are pulverized to various degrees of fineness ranging from 200 to 400 mesh, and the raw material used contains very little magnesium carbonate, though in the past a whiting substitute made from white dolomite was produced in Eastern Canada for making putty.

The principal differences between whiting made from chalk, and whiting substitute made from marble or limestone are that the latter is usually whiter, has a low capacity for absorbing oil, and the individual particles are sub-angular rather than rounded. Most of the whiting substitute made in Canada is made from white marble.

Marl suitable for making whiting substitute should be white or nearly so, be nearly free from grit and clayey material, and have a very low content of organic matter. This last-named constituent, which is present to some extent in all deposits of marl, renders the product unsuitable for use as a filler in products, such as putty and paint where it will come in contact with oils. The oil-absorptive capacity of whiting substitute made from marl is usually greater than that of whiting, but in other respects the physical characteristics of the two products are much the same. Two plants are engaged in making whiting substitute from marl.

Calcium carbonate filler, a product closely akin to whiting substitute and made by introducing carbon dioxide gas into milk-of-lime made from high-calcium quicklime, has been produced in Canada for the past several years. Its use up to the present has been as a filler in newsprint, book, and magazine paper, and its manufacture has been undertaken by the paper companies using it.

By-product precipitated chalk, made from waste sludge resulting from the manufacture of caustic soda from soda ash and lime, is classed as a whiting substitute, but its usefulness is restricted by the fact that it almost invariably contains a small amount of free alkali. The raw materials for the manufacture of by-product precipitated chalk are available but it is not yet being made in Canada.

Producers of whiting substitute are Pulverized Products, Limited, Montreal; Claxton Manufacturing Company, Toronto; White Valley Chemicals, Limited, Toronto; Marlhill Mines, Limited, Marlbank, Ontario; Gypsum, Lime and Alabastine, Canada, Limited, Winnipeg; and Beale Quarries, Limited, Van Anda, Texada Island, British Columbia.

The Industry has experienced a steady growth in recent years because improvements in grinding equipment and the maintenance of close technical control have enabled products to be marketed that are very consistent in chemical and physical properties. Many manufacturers now use the domestic products with entire satisfaction in place of imported whiting and with all European sources of whiting cut off because of the war, the domestic industry is largely supplying the Canadian market.

Whiting substitute made in Canada is used mostly in the manufacture of oilcloth, linoleum in certain kinds of rubber products, in putty, in explosives, and as a filler in newsprint, book, and magazine paper. In lesser quantities it is used in the manufacture of moulded articles, cleaning compounds and polishes, as a ceramic glaze and for a number of other purposes.

Prices per ton, bagged and in carload lots range from \$8.00 to \$15.00 per ton f.o.b. plants.

Table 296.—Consumption of Whiting, (and Chalk), by Uses, as Reported to the Annual Census of Industry, 1941 and 1942

Industry	1941		1942	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Paints and pigments.....	7,833	203,547	8,274	241,646
Rubber.....	7,619	126,312	4,495	83,129
Miscellaneous textiles*.....	1,191	19,690	4,575	50,254
Explosives (a).....	411	5,443	436	10,454
Toilet preparations (a).....	109	11,874	115	10,991

* Includes oilcloth and linoleum.

(a) Chalk, ground and precipitated.

Table 297.—Employees, Salaries and Wages, Specified Costs and Net Values, in the Stone Industry in Canada, by Provinces, 1942

Province	Firms	Average number of employees			Salaries and wages		Cost of fuel, electricity and process supplies used	Net value of production
		Salaried employees		Wage-earners	Salaries	Wages		
	No.	Male	Female		\$	\$	\$	\$
Nova Scotia.....	37	9	.....	176	22,225	276,285	44,624	719,543
New Brunswick.....	8	6	3	94	12,638	88,134	18,644	302,636
Quebec.....	170	128	22	1,387	209,871	1,613,366	890,456	3,286,009
Ontario.....	167	84	16	588	194,652	788,431	528,471	2,457,467
Manitoba.....	6	1	1	21	2,825	20,436	7,834	64,132
Alberta.....	2	(a)	(a)	(a)	(a)	(a)	(a)	40,436
British Columbia.....	22	10	2	149	13,993	211,407	37,140	359,202
Canada.....	410	238	44	2,415	456,204	2,998,059	1,517,169	7,229,425

(a) Data not available.

Table 298.—Capital Employed in the Stone Quarrying Industry of Canada, by Provinces, 1942

—	Plant	Capital employed as represented by:					
		Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
	No.	\$	\$	\$	\$	\$	\$
Nova Scotia.....	41	20,066	250,113	59,915	8,150	236,047	574,291
New Brunswick....	8	50,531	64,417	9,060		122,006	246,014
Quebec.....	183	1,265,154	2,411,876	270,516	122,605	870,157	4,940,308
Ontario.....	173	1,460,694	2,026,194	132,011	147,845	710,590	4,477,334
Manitoba.....	7	45,590	269,265	6,738		61,300	382,893
Alberta.....	2	(a)	(a)	(a)	(a)	(a)	(a)
British Columbia..	76	47,825	253,627	6,970	13,111	45,638	367,171
Canada.....	490	2,889,860	5,275,492	485,210	291,711	2,045,738	10,988,011

* Excluding unmined materials. (a) Not available.

Table 299.—Average Number of Wage-Earners, by Months, 1941 and 1942

Month	1941 Total	1942			Month	1941 Total	1942		
		Quarry		Dressing works			Quarry		Dressing works
		Surface	Under- ground				Surface	Under- ground	
January.....	1,219	1,235	14	213	July.....	3,190	2,425	5	557
February.....	1,270	1,124	16	209	August.....	3,327	2,426	6	545
March.....	1,319	1,333	6	393	September.....	3,257	2,436	5	517
April.....	2,045	1,882	8	458	October.....	3,146	2,279	6	451
May.....	2,932	2,328	8	526	November.....	2,663	2,152	4	292
June.....	3,024	2,445	7	547	December.....	2,012	1,613	10	244
					Average....	2,465	1,989	8	418

2. SECONDARY PRODUCTION

THE STONE PRODUCTS INDUSTRY

In 1942 there were 174 stone dressing works whose operations were reported separately from the quarries. These plants were engaged chiefly in cutting or polishing Canadian or imported stone to produce finished monuments or cut and dressed stone for construction purposes. Retail establishments engaged only in selling and lettering monuments have not been included. Five producers of rock wool were also included in this industry.

Output from this industry was valued at \$3,939,764 in 1942, an increase of 1.4 per cent over the total of \$3,883,496 reported for the previous year. The 74 works in Ontario accounted for 62.1 per cent of the total output and the 49 plants in Quebec for 21.7 per cent. The average number of employees was 925 and \$1,267,382 were paid in salaries and wages. Materials used in the cutting and dressing processes, including stone, cost \$1,423,387 and expenditures for fuel and electricity amounted to \$147,972.

Table 300.—Cost of Materials Used in the Stone Products Industry, 1941 and 1942

	Cost at works	
	1941	1942
Stone—(a) From Canadian quarries.....	\$ 373,780	\$ 367,605
(b) Imported.....	185,162	193,808
Monuments, cut and polished, for lettering only.....	73,799	102,052
All other materials.....	611,272	759,922
Total.....	1,244,013	1,423,387

Table 301.—Production from the Stone Products Industry, by Provinces, 1941 and 1942

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For building pur-poses	Monu-ments	For building pur-poses		Monu-ments and bases	For building pur-poses			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island and New Brunswick—										
1941.....	73,588	770	14,411			1,500		2,280	2,793	95,322
1942.....	82,551		11,084			1,500		2,440	1,115	98,690
Nova Scotia—										
1941.....	44,870	930	10,344			1,065		38,172	7,505	102,886
1942.....	38,894	1,770	17,276			1,334		32,034	4,676	95,984
Quebec—										
1941.....	335,936	35,332	5,639	57,565	7,892	4,389	22,972	9,133	283,053	761,881
1942.....	401,774	57,548	8,807	54,429	1,880	4,590	1,000	6,106	319,287	855,421
Ontario—										
1941.....	881,220	25,150	85,337	73,164	2,170	15,795	359,359	36,616	998,655	2,477,466
1942.....	840,207	37,132	92,301	75,426	7,078	3,400	101,038	78,789	1,211,518	2,447,189
Manitoba—										
1941.....	66,460		18,366			350		26,644	925	116,965
1942.....	52,475		17,389			165		31,314	8,599	115,421
Saskatchewan—										
1941.....	50,134		37,568		1,707	4,301	1,694	5,215	13,841	114,460
1942.....	47,973		37,918		1,415	6,629	350	5,875	7,991	108,151
Alberta—										
1941.....	50,233	25,000	12,328	8,000	10,112	550		641	3,541	119,405
1942.....	61,087	25,000	10,117	5,000	21,230	500		4,329	1,329	128,592
British Columbia—										
1941.....	79,575	5,717	2,276	9,565	125		240	2,000	4,613	104,111
1942.....	77,893		2,300	4,254				1,160	4,409	90,016
Canada—										
1941.....	1,582,016	92,899	186,269	148,294	22,326	31,820	384,265	120,681	1,314,926	3,883,496
1942.....	1,602,854	121,450	197,189	139,109	32,368	23,435	102,388	162,647	1,558,924	3,939,764

Table 302.—Production in Canada and Imports of Rock Wool, 1932-1942

Year	Production	Imports	
		pounds	\$
1932 (from October 12).....		309,791	5,301
1933.....		2,230,762	38,262
1934.....	1,709	2,987,611	69,267
1935.....	66,459	1,922,938	57,877
1936.....	265,472	2,391,504	101,592
1937.....	346,460	2,030,144	81,050
1938.....	396,261	1,337,954	45,109
1939.....	525,998	1,820,763	44,860
1940.....	935,229	2,082,589	52,233
1941.....	1,185,324	2,633,544	74,791
1942.....	1,417,258	1,613,914	54,776

CONTRACT DIAMOND DRILLING INDUSTRY, 1943

Firms reporting to the Dominion Bureau of Statistics as having been actively engaged in contract diamond drilling operations in 1943 totalled 27, compared with 28 in 1942. Drilling was conducted in Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia and the Northwest Territories. The footage drilled in the Dominion in 1943 totalled 2,649,708 compared with 2,960,364 in the preceding year. Of the 1943 total, 53.5 per cent was completed in Ontario, 32.2 per cent in Quebec and 10.8 per cent in British Columbia. The total income received by the industry from contract drilling operations during the year under review amounted to \$3,072,481. The average number of employees in 1943 totalled 896 and \$1,493,944 were distributed in salaries and wages.

The diamond drilling industry as a whole purchased in 1943, borts, carbons, readysset and castset bits, etc., valued at \$637,070 as against a value of \$634,233 in 1942. Of the 1943 purchases \$178,249 represented stones in the form of cast or readysset bits.

Equipment reported by contractors included 312 steam or air driven drills, 264 gas, oil and gasoline drills and 3 electric drills.

Not included in this survey are data relating to the drilling of gas and oil wells and diamond drilling conducted by Canadian mining companies with their own personnel and equipment. Statistics relating to these particular operations are combined with those pertaining to the Cana-

dian mining industry proper. However, this report is including, for the first time, supplemental tables showing separately the footage diamond drilled on metalliferous deposits by both contract diamond drillers and mine operators. From data made available it is estimated that this drilling in 1943 comprised 691,050 feet completed for exploration and testing by mining companies with their own equipment and 1,949,825 feet by contractors. In addition, blast hole diamond drilling on these deposits included 1,294,735 feet by the mining companies and 720,603 feet by contractors.

Table 303.—Contract Diamond Drilling Operations in Canada, 1942*

Province	Footage drilled	Income from drilling	Average number of employees	Total wages paid
		\$		\$
Nova Scotia.....	11,237	15,140	16	10,285
New Brunswick.....	25,171	34,056	20	23,392
Quebec.....	977,295	1,004,674	290	500,624
Ontario.....	1,536,954	1,654,116	553	815,821
Manitoba.....	91,999	146,309	29	54,143
Saskatchewan.....	11,335	11,902	4	9,566
Alberta.....				
British Columbia.....	279,152	360,450	100	177,724
Yukon.....				
Northwest Territories.....	27,221	20,885	7	5,485
Canada.....	2,960,364	3,147,532	1,019	1,597,040

Value of stones, readyset and castset bits purchased, by contractors, 1942..... \$634,233

* By contractors only and includes diamond drilling for all purposes.

Table 304.—Contract Diamond Drilling Operations in Canada, 1943*

Province	Footage drilled	Income from drilling	Average number of employees	Total salaries and wages paid
		\$		\$
Nova Scotia.....	957	1,795	5	1,664
New Brunswick.....				
Quebec.....	852,801	827,742	231	413,453
Ontario.....	1,417,935	1,763,124	508	820,591
Manitoba.....	35,844	43,357	18	23,561
Saskatchewan.....	34,860	40,951	15	20,140
Alberta.....	7,078	34,497	14	13,757
British Columbia.....	286,331	344,064	101	194,439
Yukon.....				
Northwest Territories.....	13,902	16,951	4	6,339
Canada.....	2,649,708	3,072,481	896	1,493,941

Value of stones, readyset and castset bits purchased, by contractors, 1943..... \$637,070

* By contractors only and includes diamond drilling for all purposes.

Table 305.—Drilling Completed on Auriferous Quartz Deposits (Gold Mines) in Canada, 1943

	Footage drilled
DIAMOND DRILLING FOR EXPLORATION AND TESTING—	
By mining companies with their own personnel and equipment.....	543,062
By diamond drilling contractors.....	*1,321,727
OTHER DIAMOND DRILLING—	
Blast hole diamond drilling:	
By mining companies with their own personnel and equipment.....	97,298
By diamond drilling contractors.....	*591,598
Drilling by percussion or other machines.....	(a) 20,014,708

* Included in Table 304.

(a) Not complete as records are unavailable at certain mines.

Table 306.—Drilling Completed on Copper-Gold-Silver and Nickel-Copper Deposits in Canada, 1943

	Footage drilled
DIAMOND DRILLING FOR EXPLORATION AND TESTING—	
By mining companies with their own personnel and equipment.....	109 703
By diamond drilling contractors.....	*283, 028
OTHER DIAMOND DRILLING—	
Blast hole diamond drilling:	
By mining companies with their own personnel and equipment.....	1, 197, 437
By diamond drilling contractors.....	*32, 042
Drilling by percussion or other machines.....	(a) 16, 300, 824

* Included in table 304. (a) Not complete as records are unavailable at certain mines.

Table 307.—Drilling Completed on Silver and Lead Deposits in Canada, 1943

	Footage drilled
DIAMOND DRILLING FOR EXPLORATION AND TESTING—	
By mining companies with their own personnel and equipment.....	5, 591
By diamond drilling contractors.....	*64, 425
OTHER DIAMOND DRILLING—	
Blast hole diamond drilling:	
By mining companies with their own personnel and equipment.....	
By diamond drilling contractors.....	*96, 963
Drilling by percussion or other machines.....	(a) 1, 871, 957

* Included in Table 304. (a) Not complete as records are unavailable at certain mines.

Canadian asbestos mining companies reported that 11,307 feet of diamond drilling for exploration purposes were completed by contractors in 1943, and 33,755 feet by the mining companies with their own personnel. No blast hole drilling was recorded and partial returns showed 3,021,001 feet of drilling by machines other than diamond drills.

In addition to the diamond drilling recorded in tables 305, 306 and 307, there were 280,645 feet of diamond drilling completed in 1943 on iron ores and other metal-bearing formations by diamond drilling contractors and 32,694 feet by mine operators using their own equipment. Reports received from these properties do not reveal if any blast hole drilling was included in the totals recorded.

As an aid in the development of approved mica properties, the Department of Mines and Resources, Ottawa, leased drilling equipment to several operators in 1943. Complete data pertaining to this drilling are not yet available at the Bureau of Statistics.

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1942.

Arsenic.—White arsenic (As_2O_3) produced at Canadian smelters at its sales value plus the arsenic contained in certain gold ores exported at a nominal price per pound.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Smelter production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign plants; the value given is the gross amount received by the Canadian smelter plus the value of ores exported valued according to grade at agreed prices per pound.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

The price per pound used throughout 1942 to evaluate Canadian production was that agreed upon by the Canadian Producers and the British Government, with necessary adjustments.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20·671834 per fine ounce until the end of 1930. For succeeding years, unless otherwise specified, gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds. The average price used for 1942 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other smelter products, and the recoverable silver in Canadian ores exported, at the average New York price for foreign ores in Canadian funds for the refined metal.

Tellurium and Selenium.—Smelter production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

The average price used for 1942 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements and quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country, the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

Unless otherwise arranged, the data relating to the operations of less than three firms producing the same commodity or mineral are not published separately.

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Canada. Statistics, Dominion of
CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL BRANCH

ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF
CANADA
DURING THE CALENDAR YEAR

1943

Published by Authority of the Hon. James A. MacKinnon, M.P.,
Minister of Trade and Commerce



OTTAWA
EDMOND CLOUTIER
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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Price, \$1.00

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PREFACE

Annual reports on the Mineral Production of Canada have been published since 1886. The first reports were published by the Geological Survey of Canada, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics.

The present report contains final data on the production of Canada's mines, together with details of capital employed in the industry, salaries and wages paid, the number of employees, the amounts expended on fuel and power, the power producing equipment installed, and the process supplies purchased. Bulletins on each industry are issued throughout the year and each chapter of the report is comprised of the essential features of each bulletin.

The total value of the Mineral Production of Canada, as shown in this report, includes all metals and minerals with the exception of those obtained from pitchblende ores which are still on the confidential list.

It has been the practice during pre-war years to include in this report world tables of all important minerals by countries. No figures on world production have been available since 1939 but their publication will be resumed when world censorship is lifted.

The publication of tables showing imports and exports of minerals and mineral products has been resumed in this report.

As in previous years, the Bureau co-operated with the Mines Departments of the provinces of Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia in the collection of these statistics. Forms are filled out in duplicate by the reporting companies, thereby saving the operator extra work, and resulting in uniform totals for Dominion and Provincial statistical bureaux.

The thanks of the Bureau are tendered to the Dominion Department of Mines and Resources and to the mine and smelter operators for assistance given and information made available. Close co-operation has been maintained with the office of the Metals Controller. Railway and other transportation companies as well as smelter operators outside of Canada have also furnished data, the receipt of which is gratefully acknowledged.

The report has been prepared under the direction of Mr. W. H. Losec, B.Sc., Chief of the Mining, Metallurgical and Chemical Branch, by Mr. R. J. McDowall, B.Sc., Mining Statistician.

S. A. CUDMORE,

Dominion Statistician.

DOMINION BUREAU OF STATISTICS,

OTTAWA, May 24, 1945.

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DOMINION BUREAU OF STATISTICS

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ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1943

CHAPTER ONE

Canadian primary production of minerals or mineral products during 1943 totalled \$530,053,966 as compared with \$566,768,672 in 1942. This decrease of 6.5 per cent largely reflects the curtailment in the output of gold at auriferous quartz mines.

Compared with 1942, the total value of mineral output in 1943 was less in all provinces with the exception of New Brunswick, Saskatchewan and Alberta. There was, however, no slackening by the mining industry as a whole in providing Canada and the allied nations with essential materials considered vital to a total war effort. There was distinct evidence of a revival in prospecting and exploration for new ore deposits.

The value of metals and metal-bearing minerals in 1943 amounted to \$356,812,760 as against \$392,192,452 in 1942 and the output of clay products and other structural materials at \$42,010,254 represents a decrease of \$3,719,553 from the corresponding production of the preceding year. These losses were offset to some extent by increases recorded in the output of petroleum, asbestos and certain other non-metallic minerals. Of the total value of Canadian mineral production in 1943, the province of Ontario contributed 43.95 per cent, Quebec 19.17 per cent and British Columbia 12.91 per cent.

Capital employed by the Canadian mining industry in 1943 totalled \$1,183,442,427. The industry as a whole provided employment for 142,140 persons and distributed \$207,575,955 in salaries and wages. Expenditures during the year under review, for ores, process supplies, fuel, electricity, outgoing freight and smelter treatment amounted to \$498,885,557. The labour stringency particularly affected metallic ore mining, chiefly gold.

Table 1.—Quantities and Values of Mineral Products from Canadian Sources, 1942 and 1943

	1942*		1943*	
	Quantity	Value	Quantity	Value
		\$		\$
METALLICS				
Antimony.....lb.	3,041,108	516,988	1,114,166	189,408
Arsenic (As ₂ O ₃).....lb.	14,967,874	652,041	3,153,538	254,009
Bismuth.....lb.	347,556	479,627	407,597	562,484
Cadmium.....lb.	1,148,963	1,355,776	786,611	904,602
Chromite.....ton	11,456	343,568	29,595	919,878
Cobalt.....lb.	(d) 83,871	88,444	(d) 175,961	191,407
Copper.....lb.	603,661,826	60,417,372	575,190,132	67,170,601
Gold valued at standard rate.....fine oz.	4,841,306	100,078,674	3,651,301	75,479,087
Estimated exchange equalization on gold produced.....fine oz.		86,311,607		65,096,001
Indium.....fine oz.	471	4,710		
Iron ore.....ton	545,306	1,517,077	641,294	2,032,240
Lead.....lb.	512,142,562	17,218,233	444,060,769	16,670,041

DOMINION BUREAU OF STATISTICS

	1942*		1943*	
	Quantity	Value	Quantity	Value
		\$		\$
METALLICS—Conc.				
Magnesium.....lb.	808,718	355,836	7,153,974	2,074,652
Manganese ore.....ton	435	8,932	48	985
Mercury.....lb.	1,035,914	2,943,807	1,690,240	4,559,200
Molybdenite concentrates.....lb.	227,586	134,963	784,715	549,515
Nickel.....lb.	285,211,803	69,998,427	288,018,615	71,675,322
Palladium, rhodium, iridium, etc.....fine oz.	222,573	8,279,221	126,004	5,233,068
Platinum.....fine oz.	285,228	10,898,561	219,713	8,458,951
Pitchblende products.....(a)	(a)	(a)	(a)	(a)
Selenium.....lb.	495,369	951,108	374,013	654,523
Silver.....fine oz.	20,695,101	8,726,296	17,344,569	7,849,111
Tellurium.....lb.	11,084	17,735	8,600	15,050
Tin.....lb.	1,237,863	643,689	776,937	450,623
Titanium ore.....ton	10,031	50,906	69,437	308,290
Tungsten concentrates.....lb.	520,981	406,275	1,508,621	1,083,538
Zinc.....lb.	580,257,373	19,792,579	610,754,354	24,430,174
Total.....		392,192,452		356,812,760
NON-METALLICS—FUELS				
Coal.....ton	18,865,030	62,897,581	17,859,057	62,877,549
Natural gas.....M cu. ft.	45,697,359	13,301,655	44,276,216	13,159,418
Peat.....ton	172	1,204	732	7,000
Petroleum, crude.....bbl.	10,364,796	15,968,851	10,052,302	16,470,417
Total.....		92,169,291		92,514,384
OTHER NON-METALLICS				
Asbestos.....ton	439,459	22,663,283	467,196	23,169,505
Barite.....ton	19,867	188,144	24,474	279,253
Diatomite.....ton	365	9,088	98	3,331
Feldspar.....ton	22,270	213,941	23,858	237,771
Fluorspar.....ton	6,199	146,039	11,210	318,424
Garnet rock.....ton	17	176		
Graphite.....ton	117,904	1,903	197,431	
Grindstones.....ton	216	10,000	164	6,225
Gypsum.....ton	566,166	1,254,182	446,848	1,381,468
Iron oxides (ochre).....ton	9,304	151,653	8,401	135,893
Magnesitic dolomite and brucite.....ton		1,059,374		1,260,056
Magnesium sulphate.....ton	1,140	38,760		
Mica.....ton	3,010	383,567	4,025	553,856
Mineral waters.....Imp. gal.	157,085	74,505	139,611	67,541
Nepheline syenite.....ton		246,893		292,010
Peat moss.....ton	53,506	1,069,372	64,360	1,461,422
Phosphate.....ton	1,264	17,431	1,451	18,365
Quartz.....ton	1,738,174	1,538,162	1,776,749	1,608,448
Salt (b).....ton	653,672	3,844,187	687,686	4,379,378
Silica brick.....M	4,273	263,006	4,165	285,505
Soapstone (c).....ton	14,369	136,529	14,204	185,469
Sodium carbonate.....ton	256	2,048	468	5,148
Sodium sulphate.....ton	131,258	1,079,692	107,121	1,025,151
Sulphur**.....ton	303,714	1,994,891	257,515	1,753,425
Talc.....ton	15,499	174,295	11,959	131,216
Volcanic dust.....ton			50	257
Total.....		36,677,122		38,716,569
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS				
Clay Products— Total.....		7,081,723		6,608,193
OTHER STRUCTURAL MATERIALS				
Cement.....bbl.	9,126,041	14,365,237	7,302,289	11,599,033
Lime (b).....ton	884,830	6,530,839	907,768	6,832,992
Sand and gravel.....ton	26,349,907	9,005,414	25,744,469	9,005,857
Stone (b).....ton	7,978,066	8,746,594	7,222,950	7,964,179
Total.....		38,648,084		35,402,061
Grand Total in Canadian Funds.....		566,768,672		530,053,966

*Unless otherwise noted, all total values of mineral production from 1931 to 1943, inclusive, contain estimated exchange equalization on gold produced.

**Sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Data not available for publication.

(b) Includes relatively large quantities used as a chemical material.

(c) Includes some talc.

(d) Exclusive of ore placed on government stock pile at Deloro, Ontario.

1 Ton = 2,000 lb.

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1943

		Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
METALLICS												
Antimony.....	lb.								1,114,166			1,114,166
Arsenic (As_2O_3) (a).....	lb.			2,744,921	408,617				189,408			189,408
Bismuth.....	lb.			221,085	32,924				(c)			3,153,538
Cadmium.....	lb.								407,597			354,009
Chromite.....	ton			20,595			166,955		562,484			562,484
Cobalt.....	lb.			919,878	(a)		24,130		598,673			786,611
Copper.....	lb.			131,163,776	175,961		191,998		688,474			904,602
Gold.....	fine oz.	4,129		15,411,744	277,840,580		85,948,719		42,222,205			575,190,132
Iron ore.....	ton	188,967	143,062	35,517,521	2,117,215	91,775	10,098,974	21	241,346	59,032	41,160	67,170,601
Lead.....	lb.		579,990	2,435,523	2,273,886	3,533,337	6,702,465	808	9,291,821	2,272,732	1,584,660	140,575,088
Magnesium.....	lb.			91,430	85,362							2,032,240
Manganese ore.....	ton		48		7,153,974				439,155,635		165,715	444,060,769
Mercury.....	lb.		985		2,074,652				16,485,902		7,347	16,670,041
Molybdenite (concentrates).....	lb.			784,715								784,715
Nickel.....	lb.			549,515	288,018,615				4,559,200			784,715
Palladium, rhodium, iridium, etc.....	fine oz.				71,675,322							549,515
Platinum.....	fine oz.				126,004							288,018,615
Pitchblende products.....	fine oz.				5,233,068							71,675,322
Selenium.....	lb.			216,498	82,000	5,239	70,276		7	(b)		126,004
Silver.....	fine troy oz.	144		378,872	143,500	9,168	122,983					5,233,068
Tellurium.....	lb.	65		2,212,115	2,671,320	587,279	2,812,624	1	8,995,488	13,250	52,348	17,344,569
Tin.....	lb.			1,001,071	1,208,879	265,767	1,272,825		4,070,818	23,690	23,690	7,849,111
	lb.				8,600							8,600
	lb.				15,050							15,050
	lb.								776,937			776,937
	lb.								450,623			450,623

(a) Refined arsenic produced in Canada plus As_2O_3 content of crude arsenic exported. (b) Exclusive of metal in ore placed on Government stock pile at Deloro, Ont. (c) Not available for publication. (d) Considerable unpaid-for arsenic is contained in auriferous quartz ores exported, however, data relative to its possible recovery are unobtainable.

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1943—Concluded

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—Concluded											
Brick— <i>Concluded</i>											
Dry press—Face..... M			1,188	7,206		119	1,718	183			10,504
Common..... \$			34,440	156,169		3,124	24,379	7,450			256,362
Fancy or ornamental brick (including special shapes, embossed and enamelled brick)..... M			4,149	3,153		6,168	6,218				15,680
Sewer brick..... M			83,894	93,489		1,800	64,283				243,446
Paving brick..... M				3,190							3,190
Structural tile—Hollow blocks (including fire-proofing and load-bearing tile)..... ton				191,424							191,424
Roofing tile..... \$				4,203							4,203
Floor tile (quarries)..... M				8,907							8,907
Drain tile..... M	11,875	1,610	25,378	35,980		725	6,353	2,548			84,469
Sewer pipe (including copings, flue linings, etc.)..... \$	124,687	15,536	261,874	333,256		6,055	49,067	28,460			819,535
Pottery, glazed or unglazed (including coarse earthenware, stoneware, flower pots and all other pottery)..... \$				744				85			85
Other products..... \$				26,864				1,205			26,869
Total Clay Products..... \$	478,571	216,446	1,504,428	2,453,829	132,382	348,725	978,649	495,163			6,608,193
OTHER STRUCTURAL MATERIALS											
Cement..... brl			3,394,895	1,972,009	793,913		606,703	534,769			7,302,289
Lime (x)—Quicklime..... ton			4,899,578	2,872,732	1,503,416		1,176,442	1,146,865			11,599,033
Hydrated lime..... ton	9,611	13,634	285,794	2,382,950	24,962		17,482	31,714			286,137
Total lime..... ton	111,758	132,901	2,331,293	2,794,071	216,414		142,125	291,556			5,900,688
Sand and gravel..... ton	122	3,748	96,638	28,971	5,076		7,330	6,333			11,621
Total sand and gravel..... ton	1,589	41,467	338,098	321,123	91,405		18,215	38,047			842,994
Total lime and sand and gravel..... ton	9,733	17,382	332,432	411,921	30,038		149,455	305,421			907,768
Total lime and sand and gravel..... ton	113,344	174,368	2,667,391	3,115,194	307,819		626,157	2,257,784			6,882,992
Total lime and sand and gravel..... ton	917,376	719,531	10,601,376	8,285,309	1,048,673		309,389	877,413			25,744,469
Total lime and sand and gravel..... \$	585,007	372,936	2,362,635	3,620,552	293,938		583,687	877,413			9,005,857

Stone—Granite.		7031	1,5221	634,9201	79,6821	63,9051	240,4251
	ton	28,4071	15,8551	1,164,4531	213,1361	236,2121	7,222,9501
Limestone (a)		174,4931	51,4061	2,709,3201	3,114,4901	47,8891	7,961,1791
	ton	264,1971	128,9151	2,096,2051	2,704,2051	47,8891	35,402,0611
Marble				7,5691	4,1671	851	42,010,2541
	ton			41,7201	2,8521	1,4501	530,053,3661
Sandstone		72,2321	6551	75,2981	7,8181	8,1801	356,812,7601
	ton	128,2651	2,6001	94,3881	17,1901	8,1801	92,511,5841
Slate				1911		1,1451	38,716,5881
	ton			1911		1,1451	6,608,1931
						17,5421	35,402,0611
Total stone		247,8881	53,5531	3,427,3251	37,9741	236,2121	1,625,8191
	ton	420,8691	147,3711	3,906,9671	50,7841	341,8061	2,679,9931
Total Other Structural Materials		1,119,2201	694,6751	13,928,5711	12,567,1611	1,683,1851	3,166,7881
	\$						
Total Clay Products and other Structural Materials		1,537,7911	911,1211	15,430,9991	2,288,3391	932,4121	68,412,3861
	\$	29,379,5371	3,676,8341	101,610,6781	232,948,9591	48,941,2101	1,625,8191
	\$						2,679,9931
Grand Total							
	\$						
Metallies		177,5961	580,9751	59,581,5671	204,804,3701	55,398,3871	2,279,4571
	\$	27,121,8611	2,003,1981	4,4401	6,857,8291	7,648,7201	400,5361
Other non-metallies		1,082,5891	181,5401	26,643,6721	6,265,7701	2,228,5111	38,716,5881
	\$	478,5711	216,4461	1,504,4281	2,453,8291	348,7251	978,6491
Clay products							
	\$	1,119,2201	694,6751	13,928,5711	12,567,1611	1,683,1851	35,402,0611
Grand Total—1943		29,379,8371	3,676,8341	101,610,6781	232,948,9591	48,941,2101	1,625,8191
	\$						2,679,9931
Per cent of total		5.661	0.691	19.171	43.951	9.231	0.511
	\$						100.001
Grand Total—1942		32,783,1651	3,609,1581	104,300,0101	259,114,9461	47,359,8311	3,453,5681
	\$						566,768,6721
Grand Total—1941		32,569,8671	3,690,3751	99,651,0441	267,435,7271	41,364,3851	3,117,9921
	\$						3,860,2981
Grand Total—1940		33,318,5871	3,435,9161	86,313,4911	261,483,3491	35,092,3371	2,594,1571
	\$						4,118,3331
	\$						529,825,0351

(x) Includes relatively large quantities used as a chemical.

Table 3.—Summary, by Nine Main Branches, of the Net Value of Commodity Production in Canada, 1939-1942*

	1939	1940	1941	1942	Percentage of Total Net Value 1942
	\$	\$	\$	\$	%
Agriculture.....	826,390,000	885,115,000	951,025,000	1,691,540,000	27.0
Forestry.....	271,723,416	370,121,275	421,419,139	429,079,260	6.9
Fisheries.....	34,378,681	38,106,690	51,769,638	64,821,702	1.0
Trapping.....	7,919,412	11,207,930	15,138,040	23,801,213	0.4
Mining (Total).....	393,232,044	446,080,729	497,904,632	514,109,951	8.2
Auriferous quartz.....	129,633,245	146,713,744	145,978,833	131,938,062	2.1
Other mining.....	263,598,799	299,366,985	351,925,799	382,171,889	6.1
Electric power.....	149,863,892	163,780,757	183,146,426	200,345,240	3.2
Construction.....	183,706,338	206,893,932	269,561,885	310,917,190	5.0
Custom and repair.....	96,652,386	110,745,000	135,287,000	139,349,000	2.2
Manufactures, n.e.s. (*).....	1,277,265,130	1,591,625,600	2,194,821,573	2,884,501,057	46.1
Grand Total.....	3,241,131,299	3,823,676,973	4,720,073,333	6,258,464,613	100.0
Manufactures, Total†.....	1,531,051,901	1,914,412,381	2,605,119,788	3,309,973,758	52.9

* Business Statistics Branch, Dominion Bureau of Statistics (1942 Survey of Production Report).

† The difference between "manufactures, total" and "manufactures, n.e.s." is the amount of the duplication between primary and secondary industries. The sum of "manufactures, n.e.s." and the eight other main branches is regarded as the grand total.

Table 4.—Provincial Distribution of the Net Value of Commodity Production in Canada, 1939-1942*

Province	1939	1940	1941	1942	Percentage of Total Net Value 1942
	\$	\$	\$	\$	%
Prince Edward Island.....	12,554,392	13,826,491	13,200,776	21,404,746	0.3
Nova Scotia.....	109,739,925	132,038,545	136,856,241	175,667,076	2.8
New Brunswick.....	77,156,799	90,119,421	103,968,110	128,162,880	2.1
Quebec.....	841,474,236	1,011,051,952	1,279,353,703	1,665,325,431	26.6
Ontario.....	1,365,101,538	1,642,788,599	2,087,958,441	2,529,183,058	40.4
Manitoba.....	156,371,495	176,734,411	205,348,561	295,240,285	4.7
Saskatchewan.....	212,101,124	219,966,345	228,318,037	494,011,113	7.9
Alberta.....	209,850,313	234,388,768	276,898,177	439,812,709	7.0
British Columbia.....	† 256,781,477	† 302,762,441	379,925,005	500,027,020	8.0
Yukon and Northwest Territories.....			8,246,282	9,630,295	0.2
Canada.....	3,241,131,299	3,823,676,973	4,720,073,333	6,258,464,613	100.0

* Business Statistics Branch, Dominion Bureau of Statistics (1942 Survey of Production Report).

† Includes Yukon.

Table 5.—Proportion Contributed by Mining to Total Net Value of Production in each Province, 1939-1942

Province	1939	1940	1941	1942	
	Mining Net	Mining Net	Mining Net	Mining Net	Percentage of Net Value Provincial Production
	\$	\$	\$	\$	All Mines Auriferous quartz mines only
Prince Edward Island.....					% %
Nova Scotia.....	23,504,419	26,189,233	24,535,707	17.9	25,174,960 14.3 0.2
New Brunswick.....	3,600,454	3,024,317	3,231,658	3.1	3,176,007 2.5
Quebec.....	81,600,118	98,134,979	127,649,905	10.0	138,100,940 8.3 1.5
Ontario.....	188,867,969	209,277,055	219,459,986	10.5	212,351,819 8.4 3.4
Manitoba.....	12,401,404	14,065,270	11,898,109	5.8	9,508,589 3.2 0.9
Saskatchewan.....	6,391,404	8,652,006	9,336,756	4.1	14,487,408 2.9 0.07
Alberta.....	26,049,861	29,593,293	36,167,469	13.1	40,604,704 9.2
British Columbia.....	† 50,816,415	† 57,144,576	60,323,299	15.9	64,378,171 12.9 2.7
Yukon and Northwest Territories.....			5,301,743	64.3	6,327,373 65.7 31.1
Canada.....	393,232,044	446,080,729	497,904,632	10.5	514,109,951 8.2 2.1

† Includes Yukon and Northwest Territories.

Table 6.—Annual Values of the Mineral Production of Canada since 1886

NOTE. In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals, copper, gold, lead, nickel, silver, zinc, etc., is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued chiefly at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1886	10,221,255	2.23	1915	137,109,171	17.44
1887	10,321,331	2.23	1916	177,201,534	22.05
1888	12,518,894	2.67	1917	183,646,821	23.18
1889	14,013,113	2.96	1918	211,301,897	25.37
1890	16,763,353	3.50	1919	176,686,390	20.84
1891	18,976,616	3.92	1920	227,859,665	26.40
1892	16,623,415	3.39	1921	171,923,342	19.56
1893	20,035,082	4.04	1922	184,297,242	20.55
1894	19,931,158	3.98	1923	214,079,331	23.41
1895	20,505,917	4.05	1924	209,583,406	22.71
1896	22,474,256	4.38	1925	226,583,333	24.19
1897	28,485,023	5.49	1926	240,437,123	25.61
1898	38,412,431	7.32	1927	247,356,695	25.67
1899	49,234,005	9.27	1928	274,989,487	27.96
1900	64,420,877	12.04	1929	310,850,246	31.00
1901	65,797,911	12.16	1930	279,873,578	27.42
1902	63,231,836	11.36	1931	230,434,726	22.21
1903	61,740,513	10.83	1932	191,228,225	18.20
1904	80,082,771	10.27	1933	221,495,253	20.74
1905	69,078,999	11.49	1934	278,161,590	25.67
1906	79,286,697	12.81	1935	312,344,457	28.56
1907	86,865,202	13.75	1936	361,919,372	32.82
1908	85,557,101	13.16	1937	457,359,092	41.13
1909	91,831,441	13.70	1938	441,823,237	39.42
1910	106,823,623	14.93	1939	474,602,059	41.94
1911	103,220,994	14.32	1940	529,825,035	46.39
1912	135,048,296	18.33	1941	560,241,290	49.06
1913	145,634,812	19.35	1942	556,768,672	48.63
1914	128,863,075	16.75	1943	530,053,966	*44.87
			Grand Total	10,282,036,232	

*Based on an estimated population of 11,812,000 in 1943.

NOTE.—For complete data, by minerals, see Annual Mineral Production Report for 1942.

Table 7.—Annual Values of the Mineral Production of Canada, by Classes, since 1929

Year	Metallics	Non-metallics		Total
		Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$
1929	154,454,056	97,861,356	58,534,834	310,850,246
1930	142,743,764	83,402,349	53,727,465	279,873,578
1931	120,930,147	65,346,284	44,158,295	230,434,726
1932	112,041,763	56,788,179	22,398,283	191,228,225
1933	147,015,593	57,782,973	16,696,687	221,495,253
1934	194,110,968	64,763,861	19,286,761	278,161,590
1935	221,900,849	67,328,208	23,215,400	312,344,457
1936	259,425,194	76,723,437	25,770,741	361,919,372
1937	334,165,243	88,324,150	34,869,699	457,359,092
1938	323,075,154	84,869,417	33,878,066	441,823,237
1939	343,506,123	95,733,177	35,362,759	474,602,059
1940	382,503,012	104,849,372	42,472,651	529,825,035
1941	395,346,581	119,521,437	45,373,272	560,241,290
1942	*392,192,452	128,846,413	45,729,807	566,768,672
1943	*356,812,760	131,230,952	42,010,254	530,053,966

*Exclusive of the values of pitchblende products.

NOTE.—For a history of Canadian Mining see the 1942 Annual Mineral Production Report for Canada.

DOMINION BUREAU OF STATISTICS

Table 8.—Total (Cumulative) Recorded Production in Canada of Specified Metals and Minerals to December 31, 1943

		Quantity	Value
			\$
Gold.....	(a) fine ounces	89,374,843	2,571,855,908
Silver.....	(b) fine ounces	867,292,819	488,706,170
Copper.....	(c) pounds	9,175,310,925	1,071,923,777
Nickel.....	(d) pounds	3,907,424,263	1,067,587,732
Lead.....	(b) pounds	8,262,341,389	354,727,126
Zinc.....	(f) .....	.....	256,848,376
Cobalt.....	(e) pounds	34,381,103	33,692,811
Platinum metals.....	(g) fine ounces	3,157,265	.....
Coal.....	(h) tons	669,322,057	2,031,284,132
Asbestos.....	(i) tons	8,659,674	337,939,002

NOTE.—The total value of production by the entire Canadian mining industry from 1886 to the end of 1943 totalled \$10,282,036,232.

(a) Since 1858; (b) since 1887; (c) since 1886; (d) since 1889; (e) since 1904; (f) since 1898; (g) since 1920. Production data prior to 1920 were not included owing to some doubt existing as to origin of certain metals recovered in United States plants (h) since 1785 (i) since 1880.

Table 9.—Values of the Mineral Production of Canada, by Provinces, since 1932

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba
	\$	\$	\$	\$	\$
1932.....	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365
1933.....	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951
1934.....	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934
1935.....	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417
1936.....	26,672,278	2,587,791	49,736,919	184,532,892	11,315,527
1937.....	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645
1938.....	26,253,645	3,802,555	68,965,594	219,801,994	17,173,002
1939.....	30,746,200	3,949,433	77,335,998	232,519,948	17,137,930
1940.....	33,318,587	3,435,916	86,313,491	261,483,349	17,828,522
1941.....	32,569,867	3,690,375	99,651,044	267,435,727	16,689,867
1942.....	32,783,165	3,690,158	104,300,010	259,114,946	14,345,046
1943.....	29,979,837	3,676,834	101,610,678	232,948,959	13,412,266

Year	Saskatchewan	Alberta	British Columbia	Yukon	Northwest Territories (*)
	\$	\$	\$	\$	\$
1932.....	1,681,728	21,174,061	27,326,173	1,993,195	21,423
1933.....	2,477,425	19,702,953	30,794,504	2,041,223	279,729
1934.....	2,977,061	20,228,851	41,206,965	1,628,879	199,604
1935.....	3,816,943	22,289,681	48,692,050	1,302,308	541,638
1936.....	6,970,397	23,305,726	54,407,036	2,220,372	775,834
1937.....	10,271,463	25,597,117	73,555,798	3,784,528	994,518
1938.....	7,782,847	28,966,272	64,549,130	3,959,570	1,614,076
1939.....	8,794,090	30,691,617	65,216,745	4,961,321	3,248,777
1940.....	11,505,858	35,092,337	74,134,485	4,118,333	2,594,157
1941.....	15,020,555	41,364,385	76,841,180	3,117,992	3,860,298
1942.....	20,578,749	47,359,831	77,247,932	3,453,568	3,976,267
1943.....	26,735,984	48,941,210	68,442,386	1,625,819	2,679,993

* Values of pitchblende products not included in 1942 or 1943.

Table 10.—Average Annual Metal Prices, in Canadian Dollars, 1929-1943

Year	Gold	Silver	Copper	Lead	Zinc
	Troy oz.	Troy oz.	Pound	Pound†	Pound†
	\$	\$	\$	\$	\$
1929.....	20.67	0.530	0.180*	0.050	0.054
1930.....	20.67	0.381	0.130*	0.039	0.036
1931.....	21.55	0.298	0.0837*	0.027	0.025
1932.....	23.47	0.317	0.0638	0.021	0.024
1933.....	28.60	0.378	0.0745	0.024	0.032
1934.....	34.50	0.475	0.0742	0.024	0.030
1935.....	35.19	0.648	0.0780	0.031	0.031
1936.....	35.03	0.451	0.0948	0.039	0.033
1937.....	34.99	0.449	0.131	0.051	0.0490
1938.....	35.17	0.435	0.0997	0.034	0.031
1939.....	36.14	0.405	0.101†	0.032	0.031
1940.....	38.50	0.382	0.101	0.034	0.034
1941.....	38.50	0.3826	0.101	0.034	0.034
1942.....	38.50	0.4216	0.101	0.034	0.034
1943.....	38.50	0.4525	0.1175	0.375	0.040

*Based on New York; 1932-1942 based on London.

†Based on London; prices controlled by Government since 1939 and subject to revision since 1939.

YEARLY AVERAGE PRICES OF COPPER, LEAD, ZINC AND SILVER

Table 11.—(Copper, lead and zinc in U.S. cents per pound; silver, U.S. cents per ounce)
(American Bureau of Metal Statistics)

Year	Copper New York (b)	Lead New York	Zinc (a)	Silver New York	Year	Copper New York (b)	Lead New York	Zinc (a)	Silver New York
	Yearly average	Yearly average	Yearly average	Yearly average		Yearly average	Yearly average	Yearly average	Yearly average
1889.....	13.750	3.930	5.023	93.600	1917.....	27.180	8.787	8.730	81.417
1890.....	15.750	4.480	5.550	104.600	1918.....	24.628	7.413	7.890	96.772
1891.....	12.625	4.350	5.020	98.800	1919.....	18.691	5.759	6.983	111.122
1892.....	11.550	4.090	4.630	87.600	1920.....	17.456	7.957	7.671	100.900
1893.....	10.750	3.730	4.080	78.200	1921.....	12.502	4.545	4.655	62.654
1894.....	9.560	3.290	3.520	63.000	1922.....	13.382	5.734	5.715	67.528
1895.....	10.760	3.230	3.630	65.280	1923.....	14.421	7.267	6.607	64.873
1896.....	10.880	2.980	3.940	67.060	1924.....	13.024	8.097	6.344	66.781
1897.....	11.290	3.580	4.120	59.790	1925.....	14.042	9.020	7.622	69.065
1898.....	12.030	3.780	4.570	58.260	1926.....	13.795	8.417	7.337	62.107
1899.....	16.670	4.470	5.750	59.580	1927.....	12.920	6.755	6.242	56.370
1900.....	16.190	4.370	4.390	61.330	1928.....	14.570	6.305	6.027	58.176
1901.....	16.110	4.330	4.070	58.950	1929.....	18.107	6.833	6.512	52.993
1902.....	11.626	4.069	4.840	52.160	1930.....	12.982	5.517	4.556	38.154
1903.....	13.235	4.237	5.191	53.570	1931.....	8.116	4.243	3.640	28.700
1904.....	12.823	4.309	4.931	57.221	1932.....	6.555	3.180	2.876	27.892
1905.....	15.590	4.707	5.730	60.352	1933.....	7.025	3.869	4.029	34.727
1906.....	19.278	5.657	6.048	66.791	1934.....	8.428	3.860	4.158	47.973
1907.....	20.004	5.325	5.812	65.327	1935.....	8.649	4.065	4.328	64.273
1908.....	13.208	4.200	4.578	52.864	1936.....	9.474	4.710	4.901	45.087
1909.....	12.982	4.273	5.352	51.502	1937.....	13.167	6.009	6.519	44.883
1910.....	12.738	4.446	5.370	53.486	1938.....	10.000	4.739	4.610	43.225
1911.....	12.376	4.420	5.608	53.304	1939.....	10.965	5.053	5.110	39.082
1912.....	16.341	4.471	6.799	60.835	1940.....	11.296	5.179	6.335	34.773
1913.....	15.269	4.370	5.504	59.791	1941.....	11.797	5.793	7.474	34.783
1914.....	13.602	3.862	5.061	54.811	1942.....	11.775	6.481	8.250	38.333
1915.....	17.275	4.673	13.054	49.684	1943.....	11.775	6.500	8.250	44.750
1916.....	27.202	6.858	12.634	65.661					

(a) To 1902, price of zinc at New York; for later years, price of zinc at East St. Louis.

(b) To 1898, price of Lake Copper.

RECENT TAX CHANGES OF INTEREST TO THE MINING INDUSTRY

(Department of Finance)

With a view to stimulating exploration and development of mineral resources in Canada, certain exemptions from income tax have been granted from time to time to new or re-opened mines coming into production. An amendment to the Income War Tax Act, made in May, 1936, provided that any metalliferous mine coming into production between May 1, 1936 and January 1, 1940 would be exempt from income tax for its first three fiscal periods following the commencement of production. The Minister of National Revenue, having regard to the production of ore in reasonable commercial quantities, determines which mines, whether new or old, qualify for this exemption, and a certificate is issued accordingly. In the 1939 session of Parliament an amendment to the Income Tax Act extended for a further three years the qualifying period for the above three-year exemption from January 1st, 1940 to January 1st, 1943.

In order to stimulate the production of wartime metals, Parliament in the 1942 session provided a three-year exemption from the excess profits tax for the profits of any company derived from the operation of any base metal or strategic mineral mine coming into production in the three years following after January 1st, 1943. The Minister of National Revenue was given power to determine what mines, whether new or old, and what types of minerals would qualify for this exemption. Section 89 of the Income War Tax Act was not extended and will have application only to the period now mentioned in the statute.

Provision is made for an exemption from tax in respect of dividends paid to a company incorporated in Canada by a company which has never paid a tax by reason of the three-year exemption. It might be explained that under the Income Tax Act a corporation is exempt from tax on dividends received from another corporation if the paying corporation has already paid corporation income tax on its earnings. This is to avoid double taxation of corporate earnings. It is seen, therefore, that but for this provision a receiving corporation would automatically lose the exemption (which it would otherwise enjoy) through the fact that the paying corporation had received the three-year exemption accorded to new mines and thus the purpose of the Government in allowing the three-year exemption would be defeated.

In the 1943 amendment to the Income War Tax Act a substantial concession was extended to corporations whose chief business is that of mining or exploring for metalliferous and strategic minerals. Such companies were granted a deduction from their combined income and excess profits taxes equal to 26 $\frac{2}{3}$ per cent of all prospecting, exploration and development expenses incurred in searching for base metals and strategic minerals during the period from January 1st, 1943 to March 31st, 1945, such deduction to be taken in the year of the expenditure. The deduction is contingent on provision by the company of certified statements of expenditures and submission of satisfactory evidence that the funds were expended in prospecting and exploring for base metals and strategic minerals by qualified persons.

As a companion measure to the above-mentioned exemption from excess profits tax, an amendment was made to the Income War Tax Act in 1942 designed to encourage prospecting for strategic minerals. It provided that a taxpayer contributing in 1942 to prospecting syndicates, associations or mining partnerships registered or otherwise recognized under the laws of any of the provinces, will be allowed a deduction from the income tax otherwise payable, equal to forty per cent of such contributions, provided that the tax credit will apply only in respect of contributions up to \$500 in the case of one syndicate, association or mining partnership, and only in respect of total contributions not exceeding \$5,000 in the case of any one taxpayer. In the 1943 amendment to the Income War Tax Act this provision was extended for another year to apply to contributions made during 1943, and again in 1944 was extended to apply to contributions in that year, as announced in the Budget Speech of June 26th, 1944.

General regulations covering depletion allowance to precious metal mines are unchanged from the previous year and remain on the basis of 33 $\frac{1}{3}$ per cent for mining companies, with allowance in the case of dividends received by shareholders standing at 20 per cent.

A further amendment to the Income War Tax Act provided that taxes payable by mining companies to municipalities, under certain sections of the Assessment Act in the Province of Ontario, shall be allowed as a deduction from the income of such companies in calculating their income and excess profits taxes, provided that the Minister of National Revenue is satisfied that in calculating the taxes payable to the municipalities under the above-mentioned Act no deduction is allowed in respect of income and excess profits taxes payable to the Dominion. This amendment will effect a change in the amount of taxes payable respectively to the municipalities and to the Dominion but leaves unchanged the aggregate amount of taxes payable by a mining company.

Table 12.—Mineral Production of Nova Scotia, 1941-1943

Product	1941		1942		1943		
	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$	
METALLICS—							
Antimony.....	pound						
Copper.....	pound						
Gold.....	fine oz.	19,170	738,045	12,989	500,076	4,129	158,967
Lead.....	pound						
Manganese ore.....	tons		61	91			
Manganese metal.....	pound	7,500	2,250				
Silver.....	fine oz.	673	257	446	188	144	65
Tungsten concentrates.....	pound		4,300	3,967	19,374	18,564	
Zinc.....	pound						
NON-METALLICS—							
Barytes.....	tons	6,561	72,468	17,750	172,060	22,550	263,419
Coal.....	tons	7,387,762	28,446,204	7,204,852	29,116,118	6,103,085	27,121,861
Diatomite.....	tons	239	7,310	218	6,541	82	2,465
Fluorspar.....	tons	300	3,900	300	6,584	825	17,000
Grindstones.....	tons						
Gypsum.....	tons	1,395,172	1,517,297	394,216	512,762	255,736	368,639
Quartz.....	tons	11,477	24,100	10,708	23,557	9,486	16,126
Salt.....	tons	54,007	307,637	50,199	317,798	47,775	245,157
Silica brick.....	M	2,828	119,511	3,090	142,511	3,113	169,783
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—							
Clay products.....		529,435		618,441		478,571	
Lime—							
Quicklime.....	tons	20,789	198,057	21,540	222,304	9,611	111,758
Hydrated lime.....	tons	152	1,520	310	4,030	122	1,586
Sand and gravel.....	tons	749,441	332,531	775,795	371,970	917,376	585,007
Stone.....	tons	113,602	269,345	229,517	764,167	247,868	420,869
Total.....		32,569,867		32,783,165		29,979,837	

Table 13.—Mineral Production of New Brunswick, 1941-1943

Product	1941		1942		1943		
	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$	
METALLICS—							
Iron ore.....	tons				143,002	579,900	
Manganese ore.....	tons		374	8,841	48	985	
NON-METALLICS—							
Coal.....	tons	523,344	2,021,394	435,203	1,826,403	372,873	1,641,069
Grindstones.....	tons	188	11,500	216	10,000	164	6,225
Gypsum.....	tons	56,172	150,530	36,623	111,316	36,263	148,315
Natural gas.....	M cu. ft.	653,542	317,437	619,380	299,688	675,029	327,787
Petroleum.....	brls.	31,359	44,102	28,089	39,467	24,530	34,342
Peat Moss.....	tons			295	8,100	990	27,000
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—							
Clay products.....			193,643		246,041		216,446
Lime—							
Quicklime.....	tons	14,530	122,797	16,217	146,357	13,634	132,901
Hydrated lime.....	tons	7,213	57,336	6,210	51,124	3,748	41,467
Sand and gravel.....	tons	962,483	423,772	923,020	540,541	719,531	372,936
Stone.....	tons	138,148	347,864	87,937	321,280	53,583	147,371
Total.....		3,690,375		3,609,158		3,676,834	

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Table 14.—Mineral Production of Quebec*, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Arsenic (As ₂ O ₃).....lb.	2,056,000	89,024	6,349,074	428,562	2,744,921	221,085
Chromite.....tons	2,372	42,679	11,456	343,568	29,595	919,878
Copper.....lb.	143,783,978	14,502,052	140,911,876	14,212,372	131,163,776	15,411,744
Gold.....fine oz.	1,089,339	41,939,582	1,092,388	42,056,938	922,533	35,517,521
Iron ore.....tons			187	935		
Lead.....lb.			437,634	14,713	2,435,523	91,430
Molybdenite concentrates.....lb.	196,600	88,470	222,276	131,906	784,715	549,515
Selenium.....lb.	203,162	388,039	326,208	626,319	216,498	378,872
Silver.....fine oz.	1,657,082	634,016	1,655,042	697,865	2,212,115	1,001,071
Tellurium.....lb.						
Titanium ore, sold for export.....tons	12,651	49,110	10,031	50,906	69,437	308,290
Tungsten concentrates.....lb.	989	627	2,981	2,612	5,401	5,369
Zinc.....lb.	46,389,581	1,582,349	73,940,811	2,522,121	128,169,810	5,126,792
Magnesium metal (a).....lb.			141,081	62,076		
NON-METALLICS—						
Asbestos.....tons	477,846	21,468,840	439,459	22,663,283	467,196	23,160,505
Barite.....tons	101	808				
Feldspar.....tons	14,218	137,160	16,802	164,588	17,199	176,222
Iron oxides (ochre).....tons	8,770	139,185	8,866	147,049	7,998	131,057
Magnesian dolomite and brucite.....tons		831,041		1,059,374		1,260,056
Mica.....tons	802	284,563	1,328	285,263	1,543	245,846
Natural mineral waters.....Imp. gal.	144,441	58,062	129,062	60,316	125,605	61,793
Peat fuel.....tons					522	4,440
Peat moss.....tons	7,265	173,639	12,982	197,560	14,398	298,307
Phosphate.....tons	2,487	33,376	930	12,973	1,050	14,272
Quartz.....tons	147,318	388,948	203,219	543,817	214,959	605,916
Soapstone.....tons		155,925	14,369	136,529	14,204	135,469
Sulphur.....tons	146,826	575,422	168,832	673,965	136,007	545,229
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	4,048,749	5,798,188	4,446,416	6,487,078	3,394,895	4,899,578
Clay products.....brls.		1,944,358		1,741,297		1,504,428
Lime.....tons						
Quicklime.....tons	245,814	1,791,604	263,321	1,981,535	2,857,94	2,331,293
Hydrated lime.....tons	60,701	271,140	85,255	342,172	96,638	336,098
Sand and gravel.....tons	11,681,390	2,673,500	11,026,249	2,485,853	10,601,376	2,362,635
Stone.....tons	3,775,330	3,609,567	4,188,210	4,166,465	3,427,325	3,996,967
Total.....		99,651,044		104,300,010		101,610,678

(a) Produced in Ontario from Quebec brucite.

* There is also in this province an important production of aluminum from imported ores.

† Includes some talc.

Table 15.—Mineral Production of Ontario, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLICS—		\$		\$		\$
Arsenic (As ₂ O ₃).....lb.	1,482,000	64,171	1,504,049	152,331	408,617	32,294
Bismuth.....lb.	7,499	10,379	2,333	3,219		
Chromite.....tons						
Cobalt.....lb.	263,257	255,904	(a) 83,871	88,444	(a) 175,961	191,407
Copper.....lb.	333,829,767	33,192,644	308,282,414	30,625,404	277,840,590	32,232,027
Gold.....fine oz.	3,194,308	122,980,858	2,763,819	106,407,032	2,117,215	81,512,777
Iron ore.....short tons	516,037	1,426,057	545,119	1,516,142	498,282	1,452,250
Lead.....lb.	1,622,823	54,559	3,183,150	107,018	2,273,896	85,362
Magnesium metal.....lb.			473,910	208,520	7,153,974	2,074,652
Molybdenite (concentrates).....lb.			423	150		
Nickel.....lb.	282,258,235	68,656,795	285,211,803	69,998,427	288,018,615	71,675,322
Palladium, rhodium, etc.....fine oz.	97,432	3,396,304	222,573	8,279,221	126,004	5,233,068
Platinum.....fine oz.	124,257	4,747,860	285,188	10,897,033	219,706	8,458,681
Selenium.....lb.	142,498	272,171	76,000	145,920	82,000	143,500
Silver.....fine oz.	4,977,476	1,904,432	4,452,787	1,877,862	2,671,320	1,208,879
Tellurium.....lb.	11,453	18,394	9,500	15,200	8,000	15,050
Tungsten concentrates.....lb.	3,830	2,432	162,135	145,241	494,405	356,478
Zinc.....lb.	1,100,949	37,553	4,710,394	160,671	3,299,812	131,993

Table 15.—Mineral Production of Ontario, 1941-1943—Concluded

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Non-Metallics—						
Asbestos.....	tons					
Barite.....	tons					
Diatomite.....	tons					
Feldspar.....	tons	11,822	107,124	5,468	49,353	6,659
Fluorspar.....	tons	5,234	93,867	4,340	113,957	10,385
Garnet (schist).....	tons	16	160	17	176	
Graphite.....	tons		132,924		117,904	1,903
Gypsum.....	tons	90,599	276,459	82,796	304,170	92,448
Mica.....	tons	794	47,047	1,400	89,243	2,127
Natural mineral waters.....	Imp. gal.	36,623	14,469	28,023	14,189	14,006
Natural gas.....	M cu. ft.	11,828,703	7,140,130	10,476,770	6,809,901	7,914,408
Nepheline syenite.....	\$		227,583		246,893	
Peat (fuel).....	tons	355	2,155	172	1,204	260
Peat (moss).....	tons	4,315	42,703	9,427	147,729	11,120
Petroleum.....	brls.	160,238	337,760	143,845	306,242	132,492
Phosphate.....	tons			334	4,458	401
Quartz (b).....	tons	1,745,244	899,687	1,367,733	914,256	1,350,640
Salt.....	tons	477,170	2,512,166	558,407	2,793,328	594,889
Silica brick.....	M	1,283	118,922	1,183	120,495	1,052
Strontium minerals.....	tons	27	280			
Sulphur.....	tons	10,057	100,570	18,634	186,340	16,907
Talc.....	tons	18,171	204,884	15,499	174,295	11,959
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....	brls.	2,748,854	4,019,656	2,784,782	3,998,294	1,972,009
Clay Products.....			3,087,616		2,549,486	
Lime—						
Quicklime.....	tons	373,927	2,649,304	382,667	2,761,643	382,950
Hydrated lime.....	tons	57,198	597,344	33,031	363,931	28,971
Sand and gravel.....	tons	11,569,382	4,524,463	8,420,358	3,433,986	8,285,309
Stone.....	tons	3,526,242	3,277,936	3,106,545	2,985,938	3,206,027
Total		267,435,727		259,114,946		232,948,959

† Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(a) Exclusive of metal in ore placed on Government stock pile at Deloro, Ontario.

(b) Includes low grade silica sand for fluxing purposes.

Table 16.—Mineral Production of Manitoba, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium.....	lb.	61,085	71,714	29,236	34,498	20,983
Copper.....	lb.	67,018,563	6,759,492	47,595,586	4,800,491	38,014,872
Gold.....	fine oz.	150,553	5,796,290	136,226	5,244,701	91,775
Selenium.....	lb.	32,179	61,462	21,209	40,721	5,239
Silver.....	fine oz.	966,105	389,641	821,824	346,530	587,279
Tellurium.....	lb.	†	†	361	578	†
Tungsten concentrate.....	lb.			1,399	1,300	16
Zinc.....	lb.	34,879,239	1,189,731	29,908,179	1,020,168	46,783,873
Non-Metallics—						
Coal.....	tons	1,246	3,411	1,265	3,763	999
Feldspar.....	tons					
Gypsum.....	tons	27,601	162,822	29,218	179,780	37,989
Lithium minerals.....	\$					
Natural gas.....	cu. ft.	(b)	(b)	(b)	(b)	(b)
Peat moss.....	tons	1,457	32,342	2,224	55,832	2,042
Salt.....	tons	13,051	115,367	22,706	397,101	27,523
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....	brls.	576,648	1,274,392	654,855	1,374,498	793,913
Clay products.....			84,817		80,890	
Lime—						
Quicklime.....	tons	21,444	174,624	21,443	181,052	24,962
Hydrated lime.....	tons	5,656	98,868	4,981	84,027	5,076
Sand and gravel.....	tons	1,563,501	429,996	1,443,001	427,150	1,048,673
Stone.....	tons	38,347	64,898	43,488	71,966	37,974
Total		16,689,867		14,345,046		13,412,266

† No commercial recovery reported by smelter; sometimes recovered by copper refiner but not paid for.

(b) No official reports received; estimated in previous years.

Table 17.—Mineral Production of Saskatchewan, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium.....lb.	108,832	127,769	147,314	173,831	166,955	191,998
Copper.....lb.	32,324,512	3,260,250	56,781,466	5,726,979	85,948,719	10,098,974
Gold.....fine oz.	138,015	5,313,578	178,871	6,886,533	174,090	6,702,465
Selenium.....lb.	29,091	55,564	71,952	138,148	70,276	122,983
Silver.....fine oz.	2,047,164	783,266	2,664,132	1,123,358	2,812,624	1,272,925
Tellurium.....lb.	†	†	1,223	1,957	†	†
Zinc.....lb.	62,142,288	2,119,673	84,461,520	2,880,983	96,350,404	3,854,010
NON-METALLICS—						
Coal.....tons	1,322,763	1,713,478	1,301,116	1,760,065	1,665,972	2,432,249
Grinding pebbles.....tons						
Quartz (a).....tons	148,208	51,873	155,699	54,495	163,102	57,086
Salt.....tons						
Sodium sulphate.....tons	115,600	931,522	131,258	1,079,692	107,121	1,025,151
Natural gas.....M cu. ft.	106,168	31,850	117,124	45,585	116,201	45,568
Petroleum crude.....brls.						
Volcanic dust.....tons					50	257
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....tons		224,897		271,325		348,725
Sand and gravel.....tons	1,220,801	406,835	679,979	435,798	1,288,263	583,687
Total		15,020,555		20,578,749		26,735,984

(a) Low grade silica sand for fluxing purposes.

† No commercial recovery reported. See footnote preceding table.

Table 18.—Mineral Production of Alberta, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold.....fine oz.	215	8,277	34	1,309	21	808
Silver.....fine oz.	21	8	2	1	1	
NON-METALLICS—						
Bituminous sands.....tons	(a)	(a)	(a)	(a)	(a)	(a)
Coal.....tons	6,969,962	19,382,471	7,754,053	22,624,410	7,676,726	24,030,686
Natural gas.....M cu. ft.	30,905,440	5,175,364	34,482,585	6,146,146	35,569,073	6,241,815
Peat moss.....tons	421	5,055	58	1,380	55	1,425
Petroleum.....brls.	9,918,577	13,985,906	10,117,073	15,514,665	9,601,530	15,724,518
Salt.....tons	16,617	260,995	22,360	335,960	17,499	280,124
Sodium sulphate.....tons	8	32				
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	492,515	985,030	668,043	1,307,353	606,703	1,176,442
Clay products.....tons		952,144		1,013,497		978,649
Lime.....tons						
Quicklime.....tons	17,276	144,556	18,117	148,720	17,482	142,125
Hydrated lime.....tons	674	6,740	704	7,040	733	7,330
Sand and gravel.....tons	956,484	433,504	481,644	218,914	626,157	309,389
Stone.....tons	7,942	24,303	12,028	40,436	13,961	47,899
Total		41,364,353		47,359,831		48,941,210

(a) Included with petroleum refining; no crude sands sold.

Table 19.—Mineral Production of British Columbia, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony.....lb.	3,185,077	445,911	3,041,030	516,975	1,114,166	189,408
Arsenic (As ₂ O ₃).....lb.	(a)	(a)	7,114,751 (b)	71,148	(a)	(a)
Bismuth.....lb.	12	17	345,223	476,408	407,597	562,484
Cadmium.....lb.	1,081,374	1,269,533	972,413	1,147,447	598,673	688,474
Copper.....lb.	66,327,166	6,689,758	50,015,521	5,044,565	42,222,205	4,961,109
Gold.....fine oz.	608,203	23,415,816	474,328	18,262,052	241,346	9,291,821
Indium.....fine oz.			471	4,710		
Lead.....lb.	456,840,454	15,358,976	507,199,704	17,052,054	439,155,635	16,485,902
Magnesium.....lb.	110,905	2,944	193,727	85,240		
Mercury.....lb.	536,304	1,335,697	1,035,914	2,943,807	1,690,240	4,559,200
Molybdenite.....lb.			4,887	2,907		
Platinum.....fine oz.	60	2,293	40	1,528	7	270
Silver.....fine oz.	11,233,788	4,298,160	10,596,204	4,467,996	8,995,488	4,070,818
Tin.....lb.	64,744	33,667	1,237,863	643,689	776,937	450,623
Tungsten concentrates.....lb.	34,495	21,453	250,930	228,590	976,622	692,260
Zinc.....lb.	367,869,579	12,548,031	387,236,469	13,208,636	336,150,455	13,446,018
NON-METALLICS—						
Barite.....tons	228	1,140	1,917	16,084	1,924	15,834
Coal.....tons	2,020,844	6,492,672	2,168,541	7,566,822	2,039,402	7,648,720
Diatomite.....tons	105	2,625	147	2,547	16	866
Fluorspar.....tons			1,559	25,498		
Gypsum.....tons	23,862	141,320	23,313	146,154	24,412	148,348
Iron oxides (ochre).....tons	275	2,884	438	4,604	403	4,836
Magnesium sulphate.....tons	265	7,343	1,140	38,760		
Mica (schist).....tons	148	3,678	281	9,061	355	11,821
Peat moss.....tons	14,345	390,509	28,520	658,771	35,755	925,408
Quartz.....tons	631	1,579	815	2,037	38,562	77,124
Sodium carbonate.....tons	186	1,488	256	2,048	468	5,148
Sulphur*.....tons	103,140	1,026,794	116,248	1,134,586	104,601	1,039,126
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	501,945	986,322	571,945	1,198,014	534,769	1,146,865
Clay Products.....		558,426		560,746		495,163
Lime—						
Quicklime.....tons	30,075	206,769	25,977	204,438	31,714	261,526
Hydrated lime.....tons	5,427	37,282	5,057	32,466	6,333	43,895
Sand and gravel.....tons	2,960,924	1,151,322	2,599,861	1,091,202	2,257,784	877,413
Stone.....tons	341,190	406,771	310,341	396,342	236,212	341,906
Total.....		76,841,180		77,247,932		68,412,386

* Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Considerable arsenic is contained in auriferous quartz ores exported. However, this is not paid for and data relating to its possible recovery are unobtainable.

(b) Estimated.

Table 20.—Mineral Production of Yukon, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony.....lb.			78	13		
Gold.....fine oz.	70,959	2,731,922	83,246	3,204,971	41,160	1,584,660
Lead.....lb.	1,703,728	57,280	1,322,065	44,448	195,715	7,347
Silver.....fine oz.	856,772	327,810	482,133	203,296	52,348	23,690
Tungsten concentrates.....lb.	1,560	980	968	840	12,083	10,122
NON-METALLIC—						
Coal.....tons						
Total.....		3,117,992		3,453,568		1,625,819

Table 21.—Mineral Production of Northwest Territories, 1941-1943

Product	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
Copper.....lb.	32,727	3,301	74,963	7,561		
Gold.....fine oz.	74,417	2,865,054	99,394	3,826,669	59,032	2,272,732
Pitchblende products.....	(a)	925,196	(a)	(a)	(a)	(a)
Natural gas.....M cu. ft.	1,500	335	1,500	335	1,500	335
Silver.....fine oz.	15,327	5,864	22,531	9,500	13,250	5,996
Petroleum, crude.....brls.	23,664	47,328	75,789	108,477	293,750	400,201
Tungsten concentrates.....lb.	41,972	13,220	98,218	23,725	720	729
Total		3,860,298		3,976,267		2,679,993

(a) Data not available for publication, recovered in refinery located at Port Hope, Ontario.

NOTE.—For complete data relating to Canadian Mineral Production, by Provinces, see Annual Mineral Production Report for 1942.

Table 22.—Tonnage of Ore Mined and Rock Quarried in the Canadian Mining Industry, 1941, 1942 and 1943

	1941	1942	1943
Gold quartz ores.....	20,031,736	17,722,866	12,853,610
Copper-gold-silver ores.....	9,263,071	8,575,626	8,251,579
Nickel-copper ores.....	9,974,272	12,081,545	12,925,590
Silver-cobalt ores.....	11,507	25,550	39,184
Silver-lead-zinc ores.....	2,816,974	2,951,480	3,252,657
Miscellaneous metals.....	883,851	1,120,478	1,359,008
Asbestos.....	7,707,367	8,233,516	7,929,471
Feldspar and nepheline syenite.....	57,861	77,049	90,416
Quartz, exclusive of sand.....	335,085	487,664	947,195
Gypsum.....	1,532,228	794,886	430,822
Talc and soapstone.....	38,067	30,376	22,128
Iron oxides.....	15,917	15,629	12,648
Other non-metals.....	412,159	457,251	529,326†
Stone, all kinds, quarries (exclusive of stone used for cement and lime).....	7,940,801	7,978,066	7,222,950
Stone used for the manufacture of cement.....	2,086,781	2,155,750	1,994,202
Estimate rock for the manufacture of lime.....	1,530,200	1,574,508	1,614,481
Total (other than coal)	64,637,877	64,282,240	59,475,267
Total coal	18,225,921	18,565,030	17,859,057

For years 1922 to 1940, see Annual Mineral Production Report, year 1941.

† Exclusive of Peat and Peat Moss.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1939-1943

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Metal Mining Industries							
ALLUVIAL GOLD MINES							
1939.....	98	104	9,844,524	830	1,439,765	318,613	4,204,974
1940.....	125	126	9,933,894	840	1,680,779	298,680	3,820,189
1941.....	108	110	10,755,706	797	1,954,278	332,361	3,800,142
1942.....	80	80	10,071,917	471	1,283,274	206,635	4,114,995
1943.....	43	43	11,372,849	237	646,283	157,758	1,892,214
AURIFEROUS QUARTZ MINES							
1939.....	455	474	248,692,569	30,622	53,206,225	30,380,927	129,633,245
1940.....	428	438	250,919,160	31,405	55,205,096	32,076,741	146,713,744
1941.....	338	357	243,138,864	32,551	62,150,810	33,124,349	145,978,833
1942.....	223	227	245,240,997	26,030	54,388,872	28,625,881	131,938,881
1943.....	151	156	212,675,979	19,038	40,665,283	21,236,137	95,597,710
COPPER-GOLD-SILVER MINES							
1939.....	28	30	58,867,620	6,083	9,920,591	24,978,891	26,182,577
1940.....	25	26	60,446,948	6,115	10,777,827	25,370,357	**27,804,419
1941.....	21	22	81,321,902	5,866	10,695,023	34,608,742	30,220,331
1942.....	26	28	84,776,243	5,646	11,097,412	35,459,148	33,688,642
1943.....	20	22	94,750,186	5,748	11,806,827	29,995,643	43,840,679
SILVER-COBALT MINES							
1939.....	36	43	2,461,556	323	412,728	237,096	653,032
1940(e).....	48	44	337,080	123	158,024	57,347	809,263
1941.....	24	14	439,877	192	229,984	126,372	662,443
1942.....	13	14	358,691	192	283,980	150,043	600,207
1943.....	20	21	587,039	221	290,654	142,312	578,861
SILVER-LEAD-ZINC-MINES*							
1939.....	82	83	23,664,620	1,646	2,803,057	4,690,242	13,555,609
1940.....	82	83	19,960,198	1,585	3,052,532	4,380,568	16,439,530
1941.....	63	64	17,717,334	1,666	3,452,199	3,624,765	20,653,212
1942.....	44	44	19,484,442	2,185	4,730,370	4,268,552	23,504,642
1943.....	31	32	20,603,191	3,097	6,423,724	5,140,238	21,932,644
NICKEL-COPPER MINES							
1939.....	4	7	35,307,319	5,759	10,960,710	6,117,331	32,259,124
1940.....	3	6	36,765,154	6,372	12,256,863	6,783,621	34,240,489
1941.....	3	6	41,730,329	6,490	13,680,994	7,214,448	41,525,277
1942.....	4	8	48,303,780	7,147	15,365,207	8,186,777	50,801,633
1943.....	6	10	52,250,437	7,270	15,863,646	8,896,063	54,324,097
MISCELLANEOUS METAL MINES							
1939.....	31	31	3,074,999	331	455,278	175,573	349,404
1940.....	36	36	2,720,642	445	628,025	720,173	1,309,105
1941.....	46	47	2,931,695	725	1,141,244	1,355,568	2,073,323
1942.....	68	67	3,956,427	1,352	2,396,731	1,619,686	3,996,555
1943.....	54	59	15,603,307	1,964	4,295,153	2,640,873	6,521,495
NON-FERROUS METAL SMELTING AND REFINING							
1939.....	9	13	192,186,465	12,449	19,372,119	(b)182,544,662	+ 80,057,833
1940.....	9	13	234,826,742	13,466	21,766,197	(b)207,301,259	+ 98,059,288
1941.....	9	13	309,963,342	16,014	27,482,689	(b)259,585,976	+ 119,736,294
1942.....	10	15	356,052,965	21,162	37,340,556	(b)321,736,152	+125,881,047
1943.....	9	16	392,217,159	26,749	48,491,732	(b)399,356,356	+111,857,020
Total Metal Mining Industries							
1939.....	743	785	574,999,672	58,043	98,570,473	249,452,335	256,895,798
1940.....	756	772	615,918,818	60,351	105,525,343	276,988,746	**329,196,067
1941.....	612	633	708,199,049	64,291	120,787,221	339,972,576	364,649,855
1942.....	(f) 468	483	768,245,462	64,185	126,886,402	400,152,674	374,526,623
1943.....	(g) 334	359	800,060,147	64,324	128,483,302	467,163,380	336,544,720

*Contains data relating to silver-pitchblende ores in the Northwest Territories. †Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes and cost of ores, etc., treated which were \$173,070,377 in 1938, \$154,879,498 in 1939, \$174,274,655 in 1940, \$213,542,005 in 1941, \$258,993,818 in 1942 and \$317,917,186 in 1943.

(d) See end of table.

(e) The large decrease in capital employed in the Silver-Cobalt industry in 1940 resulted largely from the leasing of the O'Brien mine and the cessation of mining operations by M. J. O'Brien Ltd. Delinquent returns, received after completion of those totals show 83 employees receiving \$88,105 in salaries and wages in the Silver-Cobalt industry also capital was increased by \$154,109.

(f) 371 producing. **Revised data. (g) 285 producing.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1939-1943—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Total Non-Metal Mining Industries, including Fuels							
*FUELS							
COAL							
1939.....	467	510	109,072,484	26,472	30,720,991	8,203,815	38,062,870
1940.....	491	527	103,634,890	26,434	34,043,162	8,996,231	43,552,679
1941.....	417	469	106,498,356	26,330	38,149,602	9,680,614	45,780,856
1942.....	380	419	108,766,697	26,205	42,091,137	10,965,528	49,473,229
1943.....	356	413	111,867,036	26,473	47,291,919	11,551,496	48,329,450
NATURAL GAS							
1939.....	222	3,352	78,409,338	1,990	2,536,220	98,397	10,634,146
1940.....	236	3,438	80,487,766	2,189	2,748,740	94,354	11,108,749
1941.....	231	3,424	81,280,541	2,161	2,841,795	108,204	11,114,899
1942.....	212	3,566	82,768,602	1,940	2,826,811	104,802	11,251,548
1943.....	191	3,558	83,963,163	1,882	2,846,514	189,740	11,362,956
PETROLEUM							
1939.....	348	2,389	52,102,077	1,780	2,567,983	1,432,055	9,310,922
1940.....	300	2,360	53,216,853	1,741	2,835,410	1,467,995	10,018,083
1941.....	272	2,312	58,206,984	1,844	3,254,817	803,798	14,207,526
1942.....	242	2,253	54,707,282	1,972	3,648,965	1,207,463	15,668,660
1943.....	233	2,197	59,058,622	2,399	5,212,895	912,358	15,994,422
TOTAL FUELS							
1939.....	1,037	6,251	239,583,899	30,242	55,825,194	9,734,267	58,007,938
1940.....	1,027	6,325	237,339,509	30,364	59,627,312	10,558,580	64,679,511
1941.....	920	6,205	245,985,881	30,355	44,246,214	10,592,616	71,103,281
1942.....	834	6,238	246,242,581	30,117	48,666,913	12,277,793	76,393,437
1943.....	780	6,168	254,888,821	30,764	55,351,328	12,653,594	75,686,888
OTHER NON-METAL MINING INDUSTRIES							
ASBESTOS							
1939.....	8	9	22,489,233	3,784	4,347,064	3,463,513	12,395,699
1940.....	8	9	19,799,280	3,886	4,728,702	3,720,968	11,903,688
1941.....	9	10	21,325,558	3,760	4,996,101	4,246,246	17,229,399
1942.....	8	10	18,741,364	3,749	5,299,454	4,393,973	18,277,235
1943.....	9	10	20,831,427	3,844	5,576,734	4,509,876	19,899,540
FELDSPAR, QUARTZ AND NEPHELINE SYENITE							
1939.....	43	43	1,591,015	338	330,170	178,721	1,173,950
1940.....	44	46	2,174,258	400	377,254	214,517	1,294,482
1941.....	38	38	2,314,582	506	610,489	250,983	1,587,071
1942.....	36	38	2,563,248	533	782,903	412,028	1,586,968
1943.....	35	37	2,895,131	535	768,199	456,852	1,681,377

* Production of peat since 1929 included with the other non-metallics.
(d) See footnote at end of table.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1939-1943—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
OTHER NON-METAL MINING INDUSTRIES—Continued							
GYPSUM							
1939.....	10	17	6,806,907	714	692,158	299,319	1,635,808
1940.....	9	16	4,648,662	694	717,666	418,339	1,647,594
1941.....	8	15	5,175,821	648	745,008	452,008	1,796,420
1942.....	7	13	4,386,531	510	657,620	244,139	1,010,043
1943.....	6	12	5,147,424	438	617,780	248,043	1,133,425
IRON OXIDES (OCHRE)							
1939.....	7	7	215,445	38	26,916	8,194	80,224
1940.....	7	7	195,263	46	38,842	18,033	93,841
1941.....	4	4	189,877	44	42,152	21,394	129,675
1942.....	5	5	194,541	47	44,288	26,615	125,038
1943.....	5	5	254,891	47	46,554	27,028	108,865
MICA							
1939.....	61	61	230,337	224	112,653	19,014	128,307
1940.....	65	65	259,168	218	134,705	27,829	209,316
1941.....	81	81	1,180,097	246	181,800	39,529	295,759
1942.....	106	106	1,460,769	361	258,605	37,311	346,254
1943.....	78	78	458,402	430	357,992	54,395	499,461
PEAT (e)							
1940.....	(f)	(f)	(f)	(f)	(f)	(f)	(f)
1941.....	22	22	825,154	667	486,116	17,472	628,936
1942.....	35	35	3,212,921	1,316	1,380,142	277,086	1,031,211
1943.....	44	44	2,477,287	1,012	1,000,348	307,674	1,384,770
SALT							
1939.....	9	9	4,447,204	547	741,736	784,778	2,173,204
1940.....	9	9	4,993,914	586	836,506	860,768	2,461,482
1941.....	9	9	5,559,307	668	1,018,652	1,175,966	2,676,533
1942.....	9	9	5,687,511	675	1,114,574	† 1,419,248	3,173,755
1943.....	9	9	5,490,594	682	1,223,009	† 1,539,774	3,648,854
TALC AND SOAPSTONE							
1939.....	6	6	239,835	65	60,512	22,332	147,734
1940.....	8	8	319,398	94	80,679	37,130	192,509
1941.....	8	8	695,581	148	128,520	55,206	305,603
1942.....	10	10	567,665	115	113,601	59,113	251,711
1943.....	8	8	576,691	90	101,719	58,031	208,654
MISCELLANEOUS							
1939.....	46	47	3,128,035	465	539,143	394,357	964,565
1940.....	46	46	2,491,527	547	703,501	608,028	1,508,728
1941.....	61	63	2,648,830	653	878,700	797,564	1,645,184
1942.....	61	64	4,919,871	811	1,142,072	952,860	2,053,307
1943.....	52	54	3,522,842	911	1,363,526	1,208,470	2,268,237

(d) See footnote at end of this table.

(e) Includes data on peat fuel, peat moss and peat humus.

† Value of containers is included from 1939.

DOMINION BUREAU OF STATISTICS

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1939-1943—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
TOTAL OTHER NON-METAL MINING INDUSTRIES							
1939.....	190	199	39,148,011	6,175	6,850,352	5,170,228	13,699,491
1940.....	196	206	34,881,470	6,471	7,618,055	5,905,612	19,311,640
1941.....	210	250	39,914,807	7,370	9,087,838	7,056,368	26,286,680
1942.....	277	290	41,734,421	8,117	10,793,259	7,822,375	27,856,622
1943.....	246	257	41,654,689	7,989	11,055,861	8,410,143	30,833,133
Total Non-Metal Mining Industries, Including Fuels							
1939.....	1,227	6,450	278,731,910	36,417	42,675,546	14,904,495	76,707,429
1940.....	1,223	6,531	272,220,979	36,835	47,245,367	16,464,192	83,991,151
1941.....	1,160	6,455	285,900,688	37,705	53,334,052	17,648,984	97,388,861
1942.....	1,111	6,528	287,977,002	38,234	59,360,172	20,100,168	104,248,959
1943.....	1,026	6,425	296,543,510	38,743	66,407,189	21,063,737	106,520,011
Clay Products and Other Structural Materials							
CLAY PRODUCTS							
Brick, Tile and Sewer Pipe							
1939.....	133	141	17,614,307	2,055	2,072,351	1,093,160	3,852,837
1940.....	132	136	16,569,424	2,343	2,488,390	1,402,681	4,581,541
1941.....	127	132	16,734,645	2,557	2,981,278	1,748,511	5,323,433
1942.....	111	115	17,181,503	2,152	2,777,171	1,420,355	5,016,090
1943.....	93	97	16,423,684	1,781	2,565,580	1,233,412	4,674,246
STONEWARE AND POTTERY							
1939.....	8	8	326,435	110	89,337	14,338	190,901
1940.....	7	7	577,019	214	186,861	19,547	340,778
1941.....	10	10	642,908	324	246,507	20,062	483,330
1942.....	8	8	612,428	371	295,840	30,884	614,394
1943.....	8	8	739,063	392	344,261	28,395	672,140
TOTAL CLAY PRODUCTS*							
1939.....	141	149	17,940,742	2,165	2,161,688	1,107,498	4,043,738
1940.....	139	143	17,146,443	2,557	2,675,251	1,422,228	4,922,319
1941.....	137	142	17,377,553	2,881	3,227,785	1,768,575	5,806,763
1942.....	119	123	17,793,931	2,523	3,073,011	1,451,239	5,630,484
1943.....	101	105	17,162,747	2,173	2,909,841	1,261,807	5,346,386
OTHER STRUCTURAL MATERIALS†							
CEMENT							
1939.....	3	8	51,251,358	1,001	1,297,542	2,238,039	6,273,172
1940.....	3	8	50,370,276	1,052	1,515,766	4,291,221	8,715,422
1941.....	3	8	51,108,294	1,235	1,860,931	5,044,208	9,279,164
1942.....	3	8	51,121,894	1,241	2,059,337	5,414,487	10,213,916
1943.....	3	8	50,438,932	1,209	2,154,218	5,557,089	7,152,763

(*) Includes kaolin and other clays.

(†) A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see chapter 9.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1939-1943—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (d)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$

OTHER STRUCTURAL MATERIALS—Concluded

LIME

1939	54	59	4,802,983	937	849,468	1,052,012	2,951,502
1940	50	55	5,107,739	962	1,003,671	1,601,546	3,593,009
1941	45	50	4,633,946	1,705	1,321,571	2,196,529	4,161,412
1942	44	48	4,742,066	1,022	1,312,320	2,598,560	3,932,279
1943	41	45	4,607,651	898	1,408,393	1,924,482	4,908,510

SAND AND GRAVEL

1939	1,403	6,215	2,735,600	6,120	3,981,913	274,509	10,966,593
1940	1,458	5,596	3,456,502	4,243	3,744,585	291,008	11,468,237
1941	1,399	5,407	4,287,789	3,252	2,995,526	474,647	9,901,076
1942	1,419	5,217	4,477,547	2,141	2,404,755	677,140	8,328,265
1943	1,387	5,054	3,674,501	2,320	2,683,257	379,435	8,626,422

STONE

1939	452	573	12,213,030	3,076	2,816,578	1,081,884	5,393,812
1940	482	560	12,127,271	2,886	2,779,703	1,204,375	6,194,584
1941	457	539	11,162,036	2,758	2,896,100	1,283,183	6,717,501
1942	412	490	10,988,011	2,697	3,454,263	1,517,169	7,229,425
1943	407	453	10,954,939	2,473	3,529,755	1,533,627	6,430,552

TOTAL OTHER STRUCTURAL MATERIALS

1939	1,912	6,855	71,003,061	11,134	8,945,501	4,646,444	25,585,079
1940	1,993	6,219	71,061,788	9,143	9,043,726	7,388,150	29,971,252
1941	1,904	6,004	71,192,065	8,350	9,074,128	8,998,567	30,059,153
1942	1,878	5,763	71,329,518	7,101	9,230,076	10,207,365	29,703,885
1943	1,838	5,560	69,676,023	6,900	9,775,623	9,394,633	27,118,247

Total Clay Products and Other Structural Materials

1939	2,053	7,004	88,943,803	13,299	11,107,189	5,753,942	29,628,817
1940	2,132	6,362	88,208,231	11,700	11,718,976	8,610,378	34,993,571
1941	2,041	6,146	88,569,618	11,231	12,301,913	10,767,140	35,965,916
1942	1,997	5,886	89,123,449	9,624	12,303,636	11,653,604	35,334,369
1943	1,939	5,665	86,838,770	9,073	12,685,464	10,656,440	32,464,633

GRAND TOTAL OF ALL INDUSTRIES

1939	4,023	14,239	941,775,385	107,759	152,353,208	270,110,772	393,232,044
1940	4,111	13,665	976,348,028	108,886	164,489,686	302,263,316	448,080,729
1941	3,813	13,234	1,082,669,355	113,227	186,423,186	368,388,700	497,904,632
1942	3,576	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,551
1943	3,299	12,449	1,183,442,427	112,110	207,575,955	498,885,557	475,528,564

Note.—The net value as given in column 8 represents the gross value as given by the operator less the cost of items indicated in column 7.

* Revised data.

Table 24.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1939-1943

1 Year	2 Number of operating mines, oil and gas wells, quarries gravel pits, etc.	3 Capital employed (excluding ore reserves or other unmined material) \$	4 Number of employees	5 Salaries and wages \$	6 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (d) \$	7 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*) \$
NOVA SCOTIA						
1939	914	52,580,559	15,202	17,371,518	5,450,671	23,504,410
1940	666	48,086,422	14,934	19,285,662	6,041,154	26,189,233
1941	622	48,356,346	15,246	21,388,809	6,684,110	24,535,707
1942	694	49,486,020	14,594	22,169,053	6,594,557	25,174,960
1943	712	51,261,925	13,852	25,348,097	6,737,166	21,979,202
NEW BRUNSWICK						
1939	426	4,466,757	3,263	2,311,835	329,538	3,600,454
1940	423	4,522,307	2,240	1,939,160	376,192	3,024,317
1941	428	4,429,485	2,262	2,097,842	421,785	3,231,658
1942	433	4,401,028	1,718	1,855,798	404,750	3,176,007
1943	433	4,320,846	1,570	1,828,019	396,622	3,249,933
QUEBEC						
1939	4,137	179,371,057	20,872	25,689,352	81,840,188	81,600,118
1940	3,857	213,363,729	21,726	29,025,418	93,034,012	⊕ 100,134,979
1941	3,780	298,678,687	23,149	34,008,021	127,618,884	127,649,905
1942	3,442	329,023,854	27,235	42,901,445	169,770,830	138,100,940
1943	3,332	368,560,300	31,491	52,859,348	234,019,383	134,500,359
ONTARIO						
1939	6,380	397,025,573	37,233	63,220,042	119,307,190	188,867,969
1940	6,406	405,063,185	38,774	66,395,845	135,879,424	209,277,055
1941	6,196	408,374,770	40,496	74,902,555	154,713,100	219,459,988
1942	6,324	438,130,467	36,866	72,868,161	168,749,548	212,551,819
1943	6,128	426,410,248	33,516	67,732,244	177,688,655	183,488,086
MANITOBA						
1939	260	36,516,216	3,027	4,541,992	16,217,955	12,401,404
1940	136	39,640,423	3,145	5,107,054	16,016,832	14,065,270
1941	155	41,780,442	3,101	5,312,075	18,966,154	11,898,109
1942	173	33,172,231	2,512	4,600,171	12,476,881	9,503,569
1943	150	29,033,717	1,777	3,497,951	9,429,404	8,973,959
SASKATCHEWAN						
1939	258	18,838,439	2,026	2,347,264	6,749,197	6,391,404
1940	252	17,008,171	1,961	2,573,878	7,033,060	6,652,006
1941	249	22,851,100	1,977	3,105,529	12,689,122	9,336,756
1942	219	34,755,279	2,450	4,401,181	22,710,389	14,487,408
1943	206	47,167,799	3,067	5,737,896	24,468,836	23,507,079

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

* See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, preceding table.

⊕ Revised data.

Table 24.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1939-1943—Concluded

1 Year	2 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	3 Capital employed (excluding ore reserves or other unmined material) \$	4 Number of employees	5 Salaries and wages \$	6 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (d) \$	7 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*) \$
ALBERTA						
1939.....	709	121,311,648	10,548	13,097,818	3,508,845	26,049,861
1940.....	729	120,234,760	10,628	14,535,789	3,832,268	29,593,293
1941.....	742	129,681,543	11,141	17,065,351	3,612,114	36,167,469
1942.....	723	126,642,796	11,446	19,628,105	4,736,312	40,604,704
1943.....	795	128,657,659	12,316	21,825,643	4,982,748	41,767,222
BRITISH COLUMBIA						
1939.....	1,130	119,437,585	14,587	21,698,690	34,754,310	45,419,651
1940.....	1,169	115,249,764	14,420	23,227,719	38,730,717	52,513,427
1941.....	1,008	114,213,762	14,801	25,797,418	42,582,946	60,323,299
1942.....	845	110,267,057	14,323	27,166,996	45,101,414	64,378,171
1943.....	654	107,674,852	13,399	25,703,433	40,092,618	54,105,996
NORTHWEST TERRITORIES						
1939.....	15	2,110,344	273	468,996	354,228	(e) 1,592,779
1940.....	16	3,037,930	441	880,414	623,965	1,539,206
1941.....	12	4,267,299	553	1,174,903	565,197	2,355,624
1942.....	29	8,888,280	701	1,737,398	951,183	3,017,569
1943.....	31	8,391,343	800	1,999,661	364,802	2,305,032
YUKON						
1939.....	10	10,117,207	728	1,605,671	1,598,650	3,803,985
1940.....	11	10,141,337	617	1,518,747	695,692	3,091,943
1941.....	12	10,035,921	501	1,570,683	535,279	2,946,119
1942.....	15	10,578,920	398	1,221,952	415,582	3,309,804
1943.....	8	11,963,738	352	1,043,663	705,323	1,652,496
Canada						
1939.....	14,239	941,775,385	107,759	152,353,208	270,110,772	393,232,044
1940.....	13,665	976,348,028	108,886	164,489,686	302,263,316	⊕ 418,080,729
1941.....	13,234	1,082,669,355	113,227	186,423,186	368,388,700	497,901,632
1942.....	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,951
1943.....	12,449	1,183,442,427	112,140	207,575,955	498,885,557	475,529,364

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

* See footnote, preceding table.

(b) Includes fuel and electricity used for metallurgical purposes.

(d) See footnote, preceding table.

(e) The value of Pitchblende refinery products is credited to the non-ferrous smelting and refining industry on Ontario and data relating to Pitchblende mining operations are included with Yukon. The value of Pitchblende refinery products are not included in 1943.

⊕ Revised data

TREND IN EMPLOYMENT, 1941³

(Employment and Payroll Statistics Branch—Dominion Bureau of Statistics)

GENERAL SUMMARY

The mining industry continued to suffer from the prevailing shortage of labour; employment in each month of the year under review was in smaller volume than in 1942, when activity was generally less than in 1941. The index declined from 162.4 at January 1, to 158.1 at the beginning of December, averaging 158.5 in the twelve months. The 1942 mean had been 171.3.

The 74,070 persons employed, on the average, by the 457 co-operating mining operators were reported to have been paid a weekly average payroll of \$2,672,498 in 1943. This was a per capita of \$36.09. In the year before, the 80,056 persons in recorded employment received an average of \$2,785,432 per week in salaries and wages, while the average per employee was \$34.81. The annual index of payrolls was 102.7 in the year under review, as compared with 108.1 in 1942; the decline in employment in the same comparison was 7.5 per cent.

Coal Mining.—There was a slight falling off in coal mining, on the whole, during 1943, when the index averaged 93.2, as compared with 94.7 in the preceding year; it should also be noted however, that the index at its 1943 maximum of 100.4 at December 1, was 8½ per cent higher than at the same date in 1942, whereas the January 1 figure had been 7.4 per cent lower than it was 12 months earlier. The more favourable situation towards the end of the year resulted from important measures taken by the Government to increase production. A working force of 25,614 persons was employed, on the average, by the 115 co-operating firms, as compared with 26,020 employees in 105 mines in 1942. The reported payrolls in the year under review amounted to \$850,359 per week, a per capita average of \$33.18. In 1942, the indicated disbursements averaged \$808,893, representing an average of \$31.09 per person. At their 1943 maximum at December 1, payrolls in the coal mining division had risen by 53 per cent from June 1, 1941, while employment in the same period had advanced by 9.7 per cent. The substantially greater gain in the disbursements was partly due to important wage adjustments authorized by the War Labour Board.

Metallic Ores.—The prevailing labour situation had an especially marked effect upon metallic ore mining, particularly upon gold mining; throughout 1943, activity was less than in 1942, or, indeed, than in any earlier year since 1937. The index averaged 303.3, as compared with 346.1 in 1942, and 366.2 in 1941, when the figure was the highest in the record. Data were tabulated from 221 employers whose working forces aggregated 37,867, varying from 39,854 at January 1, to 35,794 at the beginning of December. The reported weekly payrolls of the persons employed by the co-operating metallic ore mines averaged \$1,502,469, a per capita of \$39.70; in 1942 the weekly salaries and wages were given as \$1,668,080, and the average, \$38.60.

Non-metallic Minerals, Other than Coal.—A slight decline from 1942 was generally indicated in employment in the production of non-metallic minerals, other than coal. Information was furnished by 121 firms in 1943, with an average staff of 10,589, whose salaries and wages averaged \$319,670 per week; in the preceding year, the 10,821 persons in recorded employment had received an average of \$308,459. The average per employee rose from \$28.51 in 1942, to \$30.84 in 1943. The latest annual index of employment, at 156.3, was slightly below that of 159.4 in 1942, while the index of payrolls, averaging 116.2, was 2.6 per cent higher. Asbestos mining and certain other divisions of the group continued active, but quarrying and some other branches were quieter.

Table 25.—Strikes and Lock-outs in Canada, by Industries, 1942 and 1943 (Department of Labour)

	1942					1943				
	Number of strikes and lockouts	Workers involved		Time lost		Number of strikes and lockouts	Workers involved		Time lost	
		No.	Per cent of total	Man working days	Per cent of total		No.	Per cent of total	Man working days	Per cent of total
Agriculture.....	2	426	0.3	278	0.1					
Lodging.....	5	604	0.5	974	0.2	6	632	0.3	7,287	0.7
Fishing and trapping.....	1	3,260	2.9	10,000	2.2					
Mining, etc. (a).....	61	22,408	19.7	129,529	28.8	120	59,552	27.3	208,314	20.0
Coal mining.....	(53)	(19,670)	(17.3)	(66,318)	(14.7)	(111)	(59,017)	(27.0)	(204,980)	(19.7)
Manufacturing.....	219	80,037	70.3	296,135	65.8	222	139,656	63.9	777,661	74.7
Construction.....	31	3,889	3.4	4,266	1.0	12	785	0.4	1,920	0.2
Transportation and Public Utilities.....	15	2,233	2.0	5,439	1.2	24	8,712	3.9	18,958	1.8
Trade.....	4	61	0.0	74	0.0	7	202	0.1	718	0.1
Finance.....	1	224	0.2	1,100	0.2					
Service.....	15	774	0.7	2,407	0.5	16	8,865	4.1	26,340	2.5
Total.....	354	113,916	100.0	450,202	100.0	402(b)	218,404	100.0	1,041,198	100.0

(a) Non-ferrous smelting is included with mining..

(b) This total is not the sum of the figures given above because two protest strikes in Nova Scotia involved workers in more than one industry.

Of the 402 strikes and lockouts recorded for 1943, 120 were in mining, involving 27.3 per cent of the workers in all strikes and causing a time loss in man-working days of 20 per cent of the total. In the coal mining industry there were 111 strikes, involving 27 per cent of the workers in all strikes and causing 19.7 per cent of the total time loss. In April a general strike of 2,000 coal miners in the Drumheller Valley, Alberta, caused a time loss of 20,000 man-days; in September a strike of 1,500 miners at Springhill caused a time loss of 14,500 days; and in November a general strike of 9,850 miners in Alberta and British Columbia caused a time loss of 94,000 days. These three strikes accounted for more than 20 per cent of the workers involved in coal mining strikes and more than 60 per cent of the time loss. In manufacturing, a strike in August of 21,131 aircraft factory workers at Montreal was responsible for a time loss of 200,000 man-working days or more than 19 per cent of the total for the year. During the year 12 strikes caused about 60 per cent of the total time loss. There were no strikes in gold mining during 1943 but two were on record for 1942, one involving a small number of workers at Pickle Crow, Ontario, and the other a strike of 2,800 miners at Kirkland Lake, Ontario, which commenced in 1941 and terminated in 1942, causing a time loss of 58,000 days in 1942 and 78,000 in 1941.

Table 26. Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1943

Province	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total†	Salaries	Wages	Total
	Male	Female	Male	Female				
						\$	\$	\$
Nova Scotia.....	523	154	13,102	13	13,852	1,358,679	23,989,418	25,348,097
New Brunswick.....	63	29	1,455	23	1,570	181,335	1,640,084	1,828,019
Quebec.....	2,699	808	27,809	175	31,491	6,977,070	45,881,078	52,858,348
Ontario.....	3,050	664	28,809	993	33,516	9,814,745	57,917,499	67,732,244
Manitoba.....	170	36	1,501	70	1,777	532,387	2,965,504	3,497,951
Saskatchewan.....	311	65	2,553	105	3,067	956,140	4,781,756	5,737,896
Alberta.....	1,174	245	10,705	192	12,316	3,197,858	18,627,785	21,825,643
British Columbia.....	1,435	349	11,246	366	13,399	4,259,122	21,444,311	25,703,433
Yukon.....	52	6	259	5	352	208,197	835,466	1,043,663
Northwest Territories (a).....	209	55	527	9	500	690,847	1,308,814	1,999,661
Canada.....	9,689	2,414	98,086	1,951	112,140	28,176,980	179,398,975	207,575,955

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous years, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

(a) Pitchblende mining data included with Yukon.

Table 27.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1943

Industry	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
METAL MINING						\$	\$	\$
Alluvial Gold Mines.....	31	5	198	3	237	131,995	514,288	646,283
Auriferous Quartz Mines.....	1,750	227	16,921	140	19,038	6,088,392	34,576,891	40,665,283
Copper-Gold-Silver Mines.....	535	120	4,938	155	5,748	1,795,297	10,011,530	11,806,827
Silver-Cobalt Mines.....	34	6	189	1	221	56,570	234,084	290,654
Silver-Lead-Zinc Mines†....	359	48	2,646	44	3,097	940,099	5,483,625	6,423,724
Nickel-Copper Mines.....	401	44	6,677	148	7,270	1,273,291	14,590,355	15,863,646
Miscellaneous Metal Mines.....	232	45	1,652	35	1,964	600,684	3,694,469	4,295,153
Non-ferrous Smelting and Refining.....	2,456	919	22,577	797	26,749	7,160,290	41,331,442	48,491,732
NON-METAL MINING, INCLUDING FUELS								
Coal.....	1,359	248	24,843	23	26,473	3,502,776	43,789,143	47,291,919
Natural gas.....	769	214	883	16	1,882	1,728,318	1,118,196	2,846,514
Petroleum.....	496	155	1,736	12	2,399	1,547,605	3,665,290	5,212,895
OTHER NON-METALLIC MINING								
Asbestos.....	254	91	3,486	13	3,844	772,455	4,804,279	5,576,734
Feldspar and Quartz (a)....	58	10	465	2	535	118,703	649,496	768,199
Gypsum.....	41	10	369	18	438	116,717	501,063	617,780
Iron Oxides.....	4	3	40	.....	47	10,293	30,261	46,554
Mica.....	31	8	229	162	430	57,307	300,685	357,992
Peat (b).....	43	21	866	82	1,012	119,156	881,192	1,000,348
Salt.....	82	53	495	52	682	366,555	856,454	1,223,009
Talc and Soapstone.....	8	2	80	.....	90	23,794	77,925	101,719
Miscellaneous.....	74	10	825	2	911	155,593	1,207,933	1,363,526
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS								
Cement.....	75	16	1,091	27	1,209	215,137	1,939,081	2,154,218
Clay Products.....	190	58	1,718	207	2,173	570,300	2,339,541	2,909,841
Lime.....	78	21	797	2	898	158,629	1,249,764	1,408,393
Sand and Gravel.....	77	12	2,227	4	2,320	182,034	2,501,223	2,683,257
Stone.....	252	68	2,147	6	2,473	484,990	3,044,765	3,529,755
Total.....	9,689	2,414	98,036	1,951	112,140	28,176,980	179,398,975	207,575,955

*See footnote, preceding table.

†Includes pitchblende-silver mines.

(a) Includes nepheline-syenite mines.

(b) Includes fuel, moss and humus.

Table 28.—The Number of Wage-Earners in the Canadian Mining Industry, 1943, who Worked the Number of Hours Specified, during One Week in Month of Highest Employment

	30 hours or less	31-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-54 hours	55 hours	56-64 hours	65 hours and over	Grand total	Total wages paid in that week*
By provinces—												\$
Nova Scotia.....	123	1,532	507	186	13,118	27	222	38	820	108	16,681	549,687
New Brunswick.....	34	183	35	33	2,385	86	411	1	75	26	3,269	61,787
Quebec.....	1,207	1,825	433	710	20,527	899	2,025	371	3,984	1,239	33,220	993,009
Ontario.....	879	1,585	233	1,497	20,272	505	1,803	388	4,909	1,338	33,409	1,238,371
Manitoba.....	50	74	61	53	1,565	139	123	19	460	78	2,622	87,138
Saskatchewan.....	214	303	25	315	1,318	171	313	35	327	173	3,194	104,543
Alberta.....	509	1,083	337	254	8,208	251	704	21	512	368	12,247	482,501
British Columbia.....	289	1,534	266	239	9,770	56	266	24	1,056	54	13,554	496,066
Yukon†.....	7	4	5	1	.....	30	11	2	179	140	379	18,983
Northwest Territories.....	23	14	1	.....	420	4	22	.....	177	31	692	35,142
Canada Total, Male.....	3,188	7,916	1,809	3,111	75,998	2,089	5,767	862	12,422	3,518	116,680	4,011,362
Canada Total, Female.....	147	221	94	177	1,585	79	133	37	77	37	2,587	55,865
Canada Total.....	3,335	8,137	1,903	3,288	77,583	2,168	5,900	899	12,499	3,555	119,267	4,067,227

Table 28.—The number of Wage-Earners in the Canadian Mining Industry, 1943, who Worked the Number of Hours Specified, during One Week in Month of Highest Employment—Concluded

	30 hours or less	31-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-54 hours	55 hours	56-64 hours	65 hours and over	Grand total	Total wages paid in that week*
												\$
By Industries—												
METAL MINING												
Alluvial Gold Mines.....	5	4		2	37		6	2	169	44	269	13,668
Auriferous Quartz Mines.....	521	1,318	134	208	11,089	314	1,146	80	4,148	653	19,611	762,307
Copper-Gold Silver Mines.....	200	385	32	280	3,272	217	529	25	555	87	5,582	211,916
Silver-Cobalt Mines.....	13	43	1	6	139	6	14		54	9	285	8,177
†Silver-Lead-Zinc Mines.....	80	137	11	27	1,910	58	92	4	580	168	3,067	119,362
Nickel-Copper Mines.....	78	160	22	141	6,962	16	70	5	73	30	7,557	307,579
Miscellaneous Metal Mines.....	59	70	16	96	758	38	132	24	734	203	2,130	88,679
Non-Ferrous Smelting and Re- fining.....	657	826	210	1,400	19,322	262	1,161	64	1,339	169	25,410	806,064
Total, Male.....	1,571	2,894	405	2,107	42,295	908	3,107	196	7,630	1,331	62,447	2,278,656
Total, Female.....	39	49	21	53	1,194	3	43	8	22	32	1,464	39,096
Total.....	1,613	2,943	426	2,160	43,489	911	3,150	204	7,652	1,363	63,911	2,317,752
NON-METAL MINING, INCLUDING FUELS												
Coal.....	596	3,758	701	411	21,361	323	445	38	1,140	397	29,170	1,062,031
Natural gas.....	148	106	102	57	229	19	129	4	175	69	1,038	25,575
Petroleum.....	76	102	20	9	1,546	11	171	5	222	12	2,174	89,974
Total, Male.....	812	3,957	818	477	23,109	349	729	47	1,526	477	32,301	1,175,773
Total, Female.....	8	9	5		27	4	16		11	1	81	1,807
Total.....	820	3,966	823	477	23,136	353	745	47	1,537	478	32,382	1,177,580
OTHER NON-METAL MINING												
Asbestos.....	9	90	6	20	3,067	60	87	6	187	92	3,624	102,228
Feldspar and Quartz.....	30	39	10	25	143	27	76	17	143	59	569	16,924
Gypsum.....	55	42	27	12	106	31	50	39	92	70	524	16,169
Iron Oxides.....					34		15				49	1,077
Mica.....	71	100	17	72	137	57	69	54	43	19	639	10,466
Peat (a).....	312	388	164	160	379	114	393	30	128	51	2,119	39,142
Salt.....	35	67	31	33	96	44	67	43	110	76	602	18,709
Talc and Soapstone.....	5	7	3	5	5	2	21	3	63	13	127	2,720
Miscellaneous.....	64	116	11	35	189	23	84	14	210	294	1,040	32,911
Total, Male.....	487	688	293	249	4,016	308	823	177	942	676	8,563	230,297
Total, Female.....	94	161	66	113	140	50	39	29	34	4	730	10,139
Total.....	581	849	269	362	4,156	358	862	206	976	674	9,293	240,436
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS												
Cement.....	17	61	40	31	567	59	85	11	298	81	1,250	40,548
Clay Products.....	43	64	142	66	437	238	542	156	448	148	2,284	55,725
Lime.....	27	39	23	35	120	21	155	26	332	106	884	28,582
Sand and Gravel.....	16	34	32	24	5,391	6	45	11	266	158	5,983	115,936
Stone.....	218	181	148	133	287	222	316	238	990	547	3,280	90,758
Total, Male.....	315	377	383	278	6,578	524	1,108	112	2,324	1,640	13,269	326,776
Total, Female.....	6	2	2	11	234	22	35		10		312	4,823
Total.....	321	379	385	289	6,802	546	1,143	112	2,334	1,640	13,681	331,599

†Contains data on mining of silver-pitchblende ores in the Northwest Territories.

*Includes the actual money wages paid, the value of room and board, where provided, deductions from employees for income tax and social services, such as sickness, accident, insurance, pensions, etc., as well as any other allowance forming part of the employees' wages, includes overtime.

(a) In all forms.

Table 29.—Employees and Salaries and Wages Paid in Canadian Mining Industry, 1930-1943

Year	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	15,484	19,284,197	1,391	1,132,306	15,397	15,190,714	24,706	34,433,915	3,021	4,372,044	1,371	1,040,790
1931.....	14,871	15,302,444	1,197	1,048,860	11,141	12,666,586	20,277	30,470,475	2,059	3,096,332	1,092	896,131
1932.....	13,706	11,302,801	1,480	1,123,080	7,694	8,198,379	16,376	24,412,126	1,730	2,106,017	924	748,782
1933.....	13,915	9,852,765	1,629	1,402,114	8,629	8,621,984	17,306	25,600,168	1,379	1,847,251	1,265	1,111,001
1934.....	13,500	13,594,114	1,722	1,276,770	10,362	10,492,169	22,033	32,619,846	1,948	2,796,454	1,461	1,257,282
1935.....	14,550	14,301,510	2,390	1,865,407	11,811	12,794,600	25,264	38,152,140	2,346	3,403,649	1,457	1,343,041
1936.....	15,368	15,980,687	1,744	1,248,431	14,225	15,774,362	31,105	46,899,805	2,932	3,752,367	1,828	1,937,825
1937.....	15,629	18,373,958	3,012	1,509,063	19,121	22,708,131	36,238	58,891,339	3,159	4,301,366	2,307	2,372,443
1938.....	15,591	15,959,095	3,042	2,074,273	20,829	24,485,254	35,791	58,926,900	2,840	4,393,270	2,287	2,470,530
1939.....	15,202	17,371,518	3,263	2,311,835	20,872	25,689,382	37,233	63,220,042	3,027	4,541,992	2,026	2,347,264
1940.....	14,934	19,285,662	2,240	1,939,160	21,726	29,025,418	38,774	66,395,845	3,145	5,107,054	1,961	2,573,878
1941.....	15,246	21,388,809	2,262	2,097,842	23,149	34,008,021	40,496	74,902,555	3,101	5,312,075	1,977	3,105,529
1942.....	14,394	22,169,053	1,718	1,855,798	27,235	42,901,445	36,866	72,868,161	2,512	4,401,171	2,450	4,401,181
1943.....	13,852	25,348,097	1,570	1,828,019	31,491	52,859,348	33,516	67,732,244	1,777	3,497,951	3,067	5,737,896

Year	Alberta		British Columbia		Yukon		Northwest Territories (a)		Canada	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	12,675	16,272,916	14,836	21,412,925	319	835,525	.....	.....	89,200	113,975,332
1931.....	10,579	11,357,722	11,297	16,345,887	296	784,862	.....	.....	72,809	91,969,299
1932.....	9,692	10,476,449	9,565	12,612,151	286	761,585	17	30,679	61,470	71,772,049
1933.....	9,057	9,463,382	9,845	11,455,946	233	545,692	76	131,502	63,334	70,031,805
1934.....	9,843	9,792,297	12,270	15,482,102	286	660,814	80	154,338	73,505	88,126,186
1935.....	9,706	10,862,198	12,352	16,479,606	333	809,067	47	69,341	80,256	100,080,559
1936.....	10,376	11,850,463	12,827	17,908,553	566	1,372,917	28	40,812	90,999	116,766,222
1937.....	10,843	12,924,934	14,282	21,487,277	691	1,502,692	132	221,181	105,411	144,292,384
1938.....	10,612	12,811,975	15,179	21,975,143	794	1,962,941	310	584,619	107,275	145,644,000
1939.....	10,548	13,097,818	14,587	21,698,690	728	1,605,671	273	468,996	107,759	152,353,208
1940.....	10,628	14,535,789	14,420	23,227,719	617	1,518,747	441	880,414	108,886	164,489,686
1941.....	11,141	17,065,351	14,801	25,797,418	501	1,570,683	553	1,174,903	113,227	186,423,186
1942.....	11,435	19,628,105	14,323	27,166,996	398	1,221,952	701	1,737,398	112,032	198,550,260
1943.....	12,316	21,825,643	13,399	25,703,433	352	1,043,663	800	1,999,661	112,140	207,575,955

(a) Data relating to mining of Pitchblende ores included with Yukon.

Table 30.—Wage-earners on Surface, Underground and in Mill, 1943

Province	Metal Mines			Fuels			Other†		
	Surface (a)	Under- ground	Mill	Surface	Under- ground	Mill	Surface	Under- ground	Mill
Nova Scotia.....	18	41	6	2,083	9,814	.....	879	37	297
New Brunswick.....	.....	.....	.....	392	636	.....	288	16	146
Quebec.....	2,138	4,357	13,581	.....	.....	.....	3,962	612	3,334
Ontario.....	4,762	12,568	8,619	679	.....	.....	1,779	102	1,293
Manitoba.....	319	519	149	1	2	.....	336	16	229
Saskatchewan.....	629	488	600	331	392	.....	103	.....	145
Alberta.....	.....	.....	.....	4,028	6,151	.....	163	.....	555
British Columbia.....	1,572	2,357	3,815	790	1,958	.....	822	.....	298
Yukon (b).....	78	62	154	.....	.....	.....	.....	.....	.....
Northwest Territories..	125	105	50	256	.....	.....	.....	.....	.....
Total, 1943.....	9,641	20,497	26,974	8,560	18,953	.....	8,332	783	6,297
Total, 1942.....	28,724	24,780	3,969	7,932	19,227	.....	11,743	938	3,427
Total, 1941.....	25,940	28,388	4,198	7,902	19,608	.....	12,915	923	3,208
Total, 1940.....	23,525	27,575	3,833	8,040	19,859	.....	12,979	775	2,958
Total, 1939.....	23,018	26,530	3,750	8,037	19,861	.....	11,406	857	5,766
Total, 1938.....	23,326	24,754	3,713	8,277	20,260	.....	15,808	678	1,894

†Includes asbestos, salt, gypsum, stone quarries, brick plants, etc., etc.

(a) Including non-ferrous smelters and refineries.

(b) Includes data on mining of Pitchblende ores in Northwest Territories.

Table 31.—Fuel and Electricity Used for All Purposes in the

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian Imported		From United States	From other countries					
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.	lb.
METAL MINING									
Alluvial Gold.....Quantity	8	.....	1	.....	.....	2	24,743	478	.....
\$	720	.....	18	.....	.....	194	15,101	391	.....
Auriferous Quartz.....Quantity	10,435	41,286	3,652	125	275	38	245,156	19,213	1,02
\$	116,485	473,642	48,758	2,353	1,512	831	91,295	7,594	4
Copper-Gold-Silver.....Quantity	13,664	2,658	111	73	76,830	148	93,615	5,923	30,00
\$	103,469	29,898	1,971	1,468	229,770	2,632	32,571	1,448	68
Silver-Cobalt.....Quantity	4	1,170	114	34	.....	.....	27,648	95	.....
\$	56	19,180	1,880	571	.....	.....	8,482	24	.....
Silver-Lead-Zinc (E).....Quantity	46,516	3,002	387	.....	338	.....	55,422	1,728	.....
\$	215,144	32,659	4,082	.....	2,409	.....	19,582	815	.....
Nickel-Copper.....Quantity	1,643	13,906	155	.....	.....	13	71,117	3,030	.....
\$	13,400	112,001	2,352	.....	.....	176	17,816	630	.....
Miscellaneous Metals.....Quantity	303	4,517	86	.....	154	21,425	152,754	3,365	.....
\$	2,739	53,069	1,672	.....	1,956	102,711	49,301	1,005	.....
Non-Ferrous Smelting and	463,372	767,278	245	.....	.....	373,512	340,161	38,401	1,471,455
\$	3,780,821	6,137,251	3,393	.....	.....	4,326,749	105,224	7,478	24,366
Refining	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....Quantity	535,945	833,817	4,751	232	77,597	395,138	1,010,616	72,233	1,502,545
\$	4,232,834	6,887,700	64,126	4,392	235,647	4,433,293	539,372	19,394	25,098
NON-METAL MINING									
<i>Fuels</i>									
Coal.....Quantity	537,877	.....	.....	.....	56,063	.....	217,612	5,302	.....
\$	1,750,091	.....	.....	.....	60,619	.....	63,901	1,369	.....
Natural Gas.....Quantity	12	100	5	.....	.....	.....	53,743	2,371	.....
\$	139	1,376	70	.....	.....	.....	15,186	.....	.....
Petroleum.....Quantity	905	2	2	.....	17	.....	128,521	2,210	.....
\$	4,178	19	35	.....	36	.....	37,682	332	.....
Total.....Quantity	538,794	102	7	.....	56,080	.....	399,876	7,512	.....
\$	1,754,408	1,395	105	.....	60,655	.....	116,769	1,701	.....
<i>Other Non-Metal Mining</i>									
Asbestos.....Quantity	369	31,384	21,293	594	.....	.....	150,302	7,980	.....
\$	3,976	307,722	195,329	4,853	.....	.....	47,231	1,460	.....
Feldspar, nepheline	1,086	5,060	.....	.....	.....	32	82,187	2,571	.....
syenite and quartz.	9,700	42,454	98	.....	.....	227	23,485	439	.....
Gypsum.....Quantity	8,887	3,188	.....	.....	1,441	341	127,193	194	.....
\$	65,177	25,753	.....	.....	5,826	4,195	37,328	41	.....
Iron Oxides.....Quantity	210	563	12	.....	.....	3	1,327	100	.....
\$	2,100	6,656	156	.....	.....	42	413	19	.....
Mica.....Quantity	50	262	35	.....	.....	10	31,605	138	.....
\$	528	2,880	591	.....	.....	250	9,577	46	.....
Peat.....Quantity	.....	16	.....	.....	.....	.....	75,889	4,750	.....
\$	.....	134	.....	.....	.....	.....	19,138	841	.....
Salt.....Quantity	10,229	66,007	.....	.....	23,890	.....	10,907	82	.....
\$	63,281	421,213	.....	.....	88,420	.....	3,090	23	.....
Talc and Soapstone.....Quantity	.....	.....	.....	.....	41	.....	8,044	60	.....
\$	.....	.....	.....	.....	190	.....	2,475	12	.....
Miscellaneous.....Quantity	21,248	31,637	11	3	18,839	.....	167,998	1,745	.....
\$	104,183	281,454	195	35	59,488	.....	48,116	355	.....
Total.....Quantity	42,079	138,117	21,337	597	44,211	386	655,452	17,638	.....
\$	248,945	1,088,266	196,369	4,888	153,924	4,714	190,853	3,336	.....
STRUCTURAL MATERIALS AND CLAY PRODUCTS									
Cement.....Quantity	98,135	225,741	.....	.....	.....	.....	142,655	6,667	.....
\$	595,385	1,664,546	.....	.....	.....	.....	38,583	1,242	.....
Clay Products.....Quantity	28,281	71,115	84	.....	1,183	180	110,766	4,282	.....
\$	204,239	645,112	1,281	.....	5,062	2,092	32,642	926	.....
Lime.....Quantity	38,719	84,137	21,245	.....	.....	20,641	94,735	40	.....
\$	341,588	575,641	193,207	.....	.....	209,008	27,491	8	.....
Sand and Gravel.....Quantity	5,063	9,348	.....	.....	.....	.....	332,133	1,045	.....
\$	42,785	67,849	.....	.....	.....	.....	98,011	231	.....
Stone.....Quantity	2,311	10,354	363	105	.....	459	792,412	6,937	.....
\$	24,257	88,088	4,207	1,065	.....	5,126	225,926	1,216	.....
Total.....Quantity	172,509	400,695	21,692	105	1,183	21,280	1,472,701	18,971	.....
\$	1,208,254	3,041,236	198,695	1,065	5,062	216,226	422,653	3,623	.....
Grand Total.....Quantity	1,289,327	1,372,731	47,807	934	179,071	416,804	3,538,645	116,354	1,502,545
\$	7,444,441	10,988,597	453,295	10,345	455,288	4,654,233	1,069,647	28,054	25,098

(a) On outgoing shipments only.

(b) Paid by mine operator only.

(c) Value of 67,464,700 cu. ft. compressed air.

(d) Exclusive cost of ores treated. (E) includes Pitchblende ores.

Mineral Industry in Canada, by Kinds and Industries, 1943

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplies	Freight (a)	Treatment charges (b)
		Manufactured	Natural								
Imp. gal.	Cords	M cu.ft.	M cu.ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
36,860	1,244					52,099	10,955,900	4,301,788			
18,645	17,030				738,795,434		59,325,596	34,000	55,393	31,571	18,695
2,478,307	47,512				4,947,060	6,387,869		4,320,089			
380,084	318,051			207	269,523,279		85,880,844	65,868	12,773,650	453,720	1,620,898
712,593	697				916,307	1,426,710		2,175,430	5,506,715	1,353,139	21,409,079
102,514	3,880			(c)	2,294,327			31,815			
8,287	252			17,023	24,536	74,691			48,068	4,192	15,361
1,212	1,727				81,712,950		33,763,446				
1,104,209	1,608				480,468	986,519			2,044,367	1,655,637	453,715
201,789	29,571				161,326,077		20,280		7,969,067	18,108	112,213
996,267	518				541,426	796,675					
108,543	3,322				25,218,193		5,139,498				
2,014,882	30,613				185,784	1,059,552			1,215,049	263,513	2,759
343,017	318,298				11,009,840,128		270,383,150	25,030,900			
49,841,845	6,350	4,434	333		25,212,612	13,105,101		95,517	38,334,069		
3,472,400	29,145	5,300	262						(d)		
87,193,510	88,794	4,494	593		12,288,710,388		465,468,714	55,828,207			
4,825,154	721,124	5,300	362	17,230	32,308,109	53,880,216		227,200	67,946,578	3,779,880	23,632,720
87,522					175,576,548		47,335,794	7,057,736			
16,117				98	1,951,354	3,843,549		106,113	7,707,947		
510	2		906,442		61,736						
63	31		160,828		4,148	181,841			7,899		
151,236	245		6,601,392		2,003,695						
10,452	792		616,404	10,696	29,253	709,879			202,479		
209,971	277		7,507,844		177,641,079		47,335,794	7,057,736			
26,632	823		777,232	10,794	1,084,755	4,755,269		106,113	7,918,325		
49,970					137,385,310						
9,428					1,055,456	1,625,450			1,651,260		
214,466	776				3,604,590		1,740,806				
24,486	4,500				28,852	134,247			322,605		
36,195	193				5,371,792		1,467,586				
3,020	663		6,300	2,546	56,831	201,980			46,063		
805	972				233,800				7,590		
173	6,804				3,075	19,439					
85	1,031				206,250	21,757			29,638		
12	5,500				5,367						
8,733	586				578,605		100		48,534		
1,611	2,000				11,234	35,118					
343			91		3,701,270		7,675,462				
30			51		20,144	506,232			134,272		
14,668	102				1,578,590		156,250				
2,336	750				18,341	21,104			33,927		
2,590,358	2,379	114,213			8,782,586		2,699,998				
220,049	9,570	11,707			88,195	823,347			382,648		
2,815,685	5,949	114,213	6,891		161,422,793		13,740,202				
261,740	29,859	11,707	2,697		1,287,496	3,484,693			2,656,537		
44,132	58				150,920,220		328,452				
5,498	319				783,806	3,089,350			1,356,890		
176,013	15,026	23,295	758,138		10,748,573		258,910				
15,037	79,967	5,158	15,971	1,061	148,923	1,157,471			104,337		
1,033,350	43,232				12,874,498		1,865,183				
59,320	249,317			995	90,237	1,747,012			177,470		
97,224	10				10,859,629				57,233		
13,326	35				99,965	322,202					
352,812	1,259		1,200		20,956,390		361,500				
52,443	7,211		872		267,998	678,409			855,218		
1,783,531	59,585	23,295	759,338		206,368,310		2,814,045				
145,825	336,849	5,158	16,843	2,056	1,390,929	6,991,474			2,551,147		
62,051,795	134,575	141,942	8,273,896		12,834,163,470		529,358,755	42,885,943			
5,039,351	1,088,657	22,165	797,034	30,080	36,971,372	69,103,652		333,313	81,072,387	3,779,880	23,632,720

DOMINION BUREAU OF STATISTICS

Table 32.—Fuel and Electricity Used for All Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian	Imported	From United States	From other countries					
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.	lb.
METAL MINING									
Nova Scotia.....Quantity	372,556					2,942	92,376	265	
	\$ 1,460,273					19,614	24,119	60	
New Brunswick.....Quantity	16,711						32,291	1,800	
	\$ 112,219						8,641	450	
Quebec.....Quantity	307,991	389,949	44,087	772		2,915	1,257,953	59,731	80,000
	\$ 2,859,404	3,510,029	412,104	6,917		38,982	382,254	14,461	1,645
Ontario.....Quantity	19,673	977,473	3,715	60		335,005	1,176,904	28,888	1,392,152
	\$ 172,910	7,424,649	47,047	1,061		3,885,733	346,023	6,494	22,754
Manitoba.....Quantity	43,279	5,234			25,420	491	68,852	1,319	75
	\$ 360,441	51,641			94,458	6,380	25,108	392	3,807
Saskatchewan.....Quantity	76,175	65			48,559	73	173,124	5,840	26,761
	\$ 562,444	1,413			91,419	1,028	54,436	1,489	607
Alberta.....Quantity	188,911				27,426		218,616	4,729	
	\$ 507,498				33,315		59,843	968	
British Columbia.....Quantity	264,024	10	5	102	77,638	75,373	479,886	12,704	325
	\$ 1,408,548	865	144	2,367	235,837	702,302	147,304	2,848	14
Yukon (c).....Quantity	7					2	27,745	970	
	\$ 704					194	16,325	841	
Northwest Territories...Quantity							10,808	102	
	\$						5,594	51	
Canada.....Quantity	1,289,327	1,372,731	47,807	934	179,071	416,804	3,538,645	116,354	1,502,545
	\$ 7,444,441	10,988,597	459,295	10,345	455,288	4,654,233	1,069,647	28,054	23,095

(a) On outgoing shipments only.

(b) Paid by mine operator only.

(c) Includes data relating to mining of Pitchblende ores in Northwest Territories.

Table 33.—Fuel and Electricity Used Only for Metallurgical

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke	Charcoal
	Canadian	Imported	From United States	From Other Countries			
	Tons	Tons	Tons	Tons	Tons	Tons	lb.
Quebec.....Quantity	259,017	138,110				2,478	80,000
	\$ 2,413,933	1,314,853				33,839	1,645
Ontario.....Quantity	809	585,534	245			295,187	1,391,455
	\$ 6,600	4,478,237	3,393			3,565,575	22,721
Manitoba.....Quantity	6,682						
	\$ 55,335						
Saskatchewan.....Quantity	54,072						
	\$ 447,713						
British Columbia.....Quantity	100,036					74,440	
	\$ 606,595					692,884	
Canada.....Quantity	420,616	723,644	245			372,105	1,471,455
	\$ 3,530,176	5,793,090	3,393			4,312,298	24,366

*All Used in the non-ferrous smelting and refining industry and included in table 26.

in the Mineral Industry in Canada, by Provinces, 1943

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplies	Freight (a)	Treatment charges (b)
		Manufactured	Natural								
Imp. gal.	Cords	Mcu. ft.	Mcu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
50,128	616	114,213			108,842,606		20,539,610	3,354,145			
5,069	2,237	11,707			1,174,702	2,697,781		35,934	3,994,535	740	1,500
6,274	10,526		40,865		2,209,937						
740	57,576		16,592	599	44,203	241,020	1,217,586		152,320	282	
33,206,189	45,455	4,434			9,802,032,386		283,586,810	23,920,300			
2,518,864	257,948	5,300		396	23,349,422	33,357,726		89,494	34,860,594	1,186,821	14,942,424
20,926,830	34,203	23,295	202,167		1,567,755,618		24,005,954	1,110,600			
1,523,714	203,288	5,158	118,906	17,087	7,425,526	21,200,609		6,023	29,156,549	454,339	1,008,016
103,530	10,806				102,173,520		7,955,177				
2,143,261	80,433				333,125	1,021,473			1,412,556	102,976	1,338,895
196,817	325				359,343,697		5,003,650	11,099			
173,259	2,274				381,768	1,293,693		1,106	2,520,593		4,386,608
13,636	3,080	8,030,804			60,185,393		12,082,410	277,717			
5,000,275	14,935	661,536	10,794		623,694	1,926,219		19,498	2,905,239		
636,088	42,282				827,530,200		147,274,875	5,727,755			
374,304	366,785			1,204	3,526,550	7,030,856		84,212	5,536,748	1,880,299	1,906,101
125,849	2,249						13,741,081	4,301,788			
67,745	41,308					185,221		34,000	347,474	148,665	23,963
19,154	5,033				4,090,110		13,951,602	4,182,569			
	61,871				62,382	149,052		63,046	184,779	5,758	25,213
62,051,795	154,575	141,942	8,273,896		12,834,163,470		529,358,755	42,885,943			
5,059,351	1,088,655	22,165	797,034	30,080	36,971,372	69,103,652		333,313	81,072,387	3,779,880	23,632,720

Purposes in the Mineral Industry of Canada, by Provinces, 1943(*)

Gasolene	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other	Electricity	Total	Electricity generated own use
				Manufactured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
10,320	1,203	30,726,460	4,630	4,434			8,925,699,261		261,748,496
3,415	273	2,192,226	14,816	5,300			18,840,245	24,820,545	
49,360	355	17,842,172	184		333		327,516,993		
12,761	61	1,124,279	1,560		362		1,056,855	10,292,404	
		2,490	40				27,960,791		
		381	281				21,660	77,657	
		20,145	325				226,228,224		
		3,082	2,274				175,253	628,322	
85,934		1,123,624	793				655,709,950		
28,466		126,857	7,131				2,488,864	3,950,797	
145,614	1,558	49,714,891	5,972	4,434	333		10,163,115,239		261,748,496
41,642	334	3,446,825	26,062	5,300	362		22,582,877	39,769,725	

Table 34.—Electricity Purchased by Canadian Mining Industry, 1934-1943

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1934	415,570,323	3,091,147	2,099,586,731	8,433,428	2,359,525,280	11,510,481
1935	464,146,582	3,722,163	2,320,385,917	9,415,062	2,591,470,745	12,546,298
1936	449,026,003	4,345,066	2,841,045,187	10,783,296	3,151,192,519	14,055,915
1937	629,083,378	5,031,691	3,368,047,901	12,442,423	3,744,919,549	16,135,702
1938	741,866,953	5,333,427	4,125,037,129	13,917,518	4,441,098,287	17,485,652
1939	777,832,223	5,803,160	4,449,477,330	13,060,673	4,817,050,497	18,749,417
1940	868,846,323	5,893,562	5,105,497,931	17,005,546	5,569,961,386	21,066,734
1941	947,563,696	6,277,626	7,105,275,873	22,373,156	7,630,138,911	26,710,350
1942	846,900,417	5,856,971	9,626,254,575	29,004,724	10,186,657,256	33,614,088
1943	738,795,434	4,947,060	12,288,710,388	32,308,193	12,834,163,470	36,971,372

*Includes service charges, for previous years see annual mineral production report for 1942.

Table 35.—Power Equipment in Use, and Power Equipment in Reserve

Province	Ordinarily in use									Boilers
	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	
Nova Scotia.....No.	47	6	47	24		124	977	1,101	163	81
H.P.	37,274	11,254	5,181	1,191		54,900	67,336	122,236	9,787	27,796
New Brunswick.....No.	15		26	17		58	259	317	15	21
H.P.	1,715		283	935		2,936	1,069	4,905	255	1,365
Quebec.....No.	38	6	113	310	16	483	11,063	11,546	501	158
H.P.	1,468	8,740	21,865	10,795	54,040	96,908	310,474	407,382	7,612	32,939
Ontario.....No.	100	16	63	452	6	637	13,349	13,986	657	207
H.P.	6,063	5,670	5,464	16,385	2,395	35,977	417,589	453,566	12,140	27,853
Manitoba.....No.	8	1	5	31		46	976	1,022	172	17
H.P.	253	500	734	529	1,900	3,916	29,822	33,738	2,869	2,327
Saskatchewan.....No.	15	2	23	54		94	1,869	1,963	129	19
H.P.	1,030	1,375	2,653	1,364		6,422	74,909	81,331	1,918	3,858
Alberta.....No.	174	8	12	201		395	1,714	2,109	351	236
H.P.	36,330	1,970	880	8,042		47,222	51,314	98,536	7,827	28,822
British Columbia.....No.	82	17	72	124	64	359	4,420	4,779	1,490	72
H.P.	14,639	20,691	12,510	4,366	28,467	80,673	165,329	246,002	39,724	12,537
Yukon (a).....No.			7	4		11		11	214	2
H.P.			1,343	380		1,723		1,723	6,532	120
N.W.T.....No.			1	2	1	4	78	82	34	6
H.P.			156	8	4,700	4,864	1,210	6,074	626	411
Canada.....No.	479	56	369	1,219	88	2,211	34,705	36,916	3,727	819
H.P.	98,772	50,200	51,069	43,998	91,502	335,541	1,119,952	1,455,493	89,290	138,028

(a) Includes data relating to mining of Pitchblende in the Northwest Territories.

Table 36.—Power Equipment in Use and Power Equipment in

ORDINARILY IN USE

Industry	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
METAL MINING—										
Alluvial Gold Mines.....No.	1		8	15	2	26		26	122	
H.P.	15		805	236	90	1,146		1,146	5,398	
Auriferous Quartz Mines.....No.	6	3	33	43	15	100	8,973	9,073	1,044	168
H.P.	255	900	8,980	3,393	15,685	29,213	234,810	264,023	17,783	14,616
Copper-Gold-Silver Mines.....No.		1	18	9	6	34	2,794	2,828	471	42
H.P.		13,400	3,986	615	8,900	26,901	106,067	132,968	16,549	10,280
Silver-Cobalt Mines.....No.	2		3			5	73	78		5
H.P.	195		125			320	1,693	2,013		175
Silver-Lead-Zinc Mines (a).....No.		3	24	13	12	52	933	985	568	17
H.P.		6,000	3,951	585	1,580	12,116	22,330	34,446	12,051	2,910
Nickel-Copper Mines.....No.	1		3	1		5	986	991		5
H.P.	15		255	4		274	41,652	41,926		470
Miscellaneous Metal Mines.....No.			21	25		46	454	500	80	16
H.P.			3,107	939		4,046	17,118	21,164	1,840	1,248
Non-ferrous Smelting and Refining.....No.	25	7	15	22	11	80	11,922	12,002	328	54
H.P.	2,556	13,220	8,361	2,008	51,125	77,270	374,475	451,745	4,153	30,100
Total.....No.	35	14	125	128	46	348	26,135	26,483	2,613	307
H.P.	3,036	33,520	29,570	7,780	77,380	151,286	798,145	949,431	57,774	59,799

or Idle, in the Mineral Industry in Canada, by Provinces, 1943

In reserve or idle

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
9	1	10	30		50	45	95	6	11	26
1,303	502	1,301	1,822		4,928	1,608	6,536	282	3,171	2,198
			5		5	23	28		1	1
			49		49	290	339		50	10
9		17	56	2	84	1,066	1,150	47	41	249
425		2,460	3,658	50	6,593	27,400	33,993	1,420	6,987	25,572
17		20	88		127	1,154	1,281	81	39	477
2,011	195	3,371	5,670		11,247	39,760	51,007	2,620	3,733	96,754
		3	12		15	52	67	19	3	26
		501	820		1,321	1,821	3,142	245	250	2,623
3	3	6	9		21	127	148	27	6	45
0	2,515	1,340	435		4,790	4,104	8,894	670	1,255	38,721
501		2	32		72	90	162	24	31	50
6,238	718	385	1,401		8,792	3,989	12,781	532	2,771	4,053
88	5	26	41	6	86	672	758	139	19	126
1,368	10,300	3,043	985	840	16,536	16,602	33,138	2,891	1,243	58,098
		2			2		2	249		3
		165			165		165	14,606		11
		8	1		9	6	15	127		3
		1,285	10		1,295	365	1,660	2,147	171	185
77	18	94	274	8	471	3,235	3,706	719	154	1,017
11,895	14,230	13,851	14,850	890	55,716	95,939	151,655	25,413	19,631	228,225

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1943

IN RESERVE OR IDLE

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
		5	6	5	16		16	235	6	
		129	66	60	255		255	14,599	81	
6	4	44	102	1	167	829	986	242	53	409
857	445	7,436	7,240	780	16,768	24,363	41,121	5,055	3,723	16,271
	3	3	3		9	151	160	51	6	98
	10,050	710	270		11,030	4,192	15,222	2,525	140	28,562
2		1	3		6	15	21		1	
40		120	24		184	516	700		10	
		7	6		13	128	141	55	1	35
		664	439		1,103	4,462	5,565	895	20	3,358
						67	67		2	78
						1,955	1,955		145	32,231
2		10	6		18	30	48	7	3	12
311		1,500	535		2,346	506	2,852	343	259	1,043
1	3	2	1		7	1,286	1,293	29	11	225
1,074	2,515	175	60		3,884	29,003	32,827	344	6,750	134,065
11	10	72	127	6	226	2,506	2,732	619	83	857
2,282	13,010	10,734	8,634	840	35,600	64,997	100,497	23,761	11,128	215,530

Table 36.—Power Equipment in Use and Power Equipment in Reserve
ORDINARILY IN USE

Industry	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
NON-METAL MINING, INCLUDING FUELS—										
Coal..... No.	215	14	13	201	2	445	3,061	3,506	460	215
H.P.	61,213	12,021	865	3,720	12,000	89,819	121,871	211,690	21,592	47,073
Natural Gas..... No.	7		26	237		270	107	377	23	14
H.P.	235		283	8,110		8,628	1,107	9,735	1,273	2,460
Petroleum..... No.	67	6	8	107		188	162	350	33	120
H.P.	25,153	415	555	6,167		32,290	1,058	33,348	525	11,651
Total..... No.	289	20	47	545	2	903	3,330	4,233	516	349
 H.P.	86,601	12,436	1,703	17,997	12,000	130,787	124,036	254,773	23,390	61,184
OTHER NON-METAL MINING										
Asbestos..... No.	6	1	1	33		41	1,098	1,139		3
H.P.	210	120	105	1,161		1,596	54,069	55,665		80
Feldspar, nepheline syenite and quartz. No.	8		18	32		58	99	157	122	9
H.P.	508		2,052	1,186		3,748	2,043	5,789	1,192	785
Gypsum..... No.	4		12	13		29	191	220	25	5
H.P.	1,130		1,355	781		3,266	6,059	9,325	551	750
Iron Oxides..... No.			1			1	15	16		
H.P.			30			30	100	130		
Mica..... No.	2			23		25	11	36		3
H.P.	60			627		687	215	902		90
Peat..... No.	2		4	81		87	54	141		1
H.P.	50		240	2,452		2,742	667	3,409		15
Salt..... No.	18	14		3		35	146	181	229	8
H.P.	900	3,444		32		4,376	988	5,364	2,265	4,720
Talc and Soap-stone. No.			4	10		14	37	51	13	
H.P.			343	230		573	685	1,258	132	
Miscellaneous..... No.	4		19	20	2	45	262	307	77	15
H.P.	63		2,161	948	300	3,472	6,290	9,762	1,109	902
Total..... No.	44	15	59	215	2	355	1,913	2,248	466	44
 H.P.	2,921	3,564	6,286	7,417	300	20,488	71,116	91,604	5,249	7,342
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—										
Cement..... No.			5	41		46	1,472	1,518	26	9
H.P.			1,176	1,254		2,430	76,989	79,419	968	515
Clay Products..... No.	33	2	7	49	17	108	405	513	26	53
H.P.	3,128	250	560	1,418	712	6,068	12,185	18,253	267	5,114
Lime..... No.	7		5	20	6	38	497	535	57	11
H.P.	225		569	553	105	1,452	7,957	9,409	835	1,558
Sand and Gravel..... No.	9		6	54	7	76	192	268		7
H.P.	459		520	1,965	240	3,184	6,687	9,871		497
Stone..... No.	62	5	115	167	8	357	761	1,118	23	39
H.P.	2,402	430	10,685	5,614	765	19,896	22,837	42,733	807	2,019
Total..... No.	111	7	138	331	38	685	3,327	3,952	132	119
 H.P.	6,214	680	13,510	10,804	1,822	33,030	126,655	159,685	2,877	9,703
Grand Total 1943..... No.	479	56	369	1,219	88	2,211	34,705	36,916	3,727	819
 H.P.	98,772	50,200	51,069	43,998	91,502	335,541	1,119,952	1,455,493	89,290	138,028
Grand Total 1942..... No.	546	†	311	1,604	85	2,546	32,609	35,155	4,601	804
 H.P.	153,068	†	42,240	50,710	116,765	362,783	1,093,541	1,456,324	114,951	125,430

† Included with steam engines (a) Includes Pitchblende ores.

or Idle, in the Mineral Industry in Canada, by Industries, 1943—Concluded

IN RESERVE OR IDLE

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
31 7,579	1 500		19 356		51 8,435	146 3,622	197 12,057	13 357	26 4,935	79 7,316
6 310	2 198	2 385	32 1,308		60 2,201	10 140	60 2,341	6 175	14 671	102 28
37 7,889	3 698	2 385	53 1,724		95 10,606	156 3,762	251 14,458	24 532	40 5,606	83 7,426
						30 3,254	39 3,254			3 19
			5 86		5 86	5 71	10 157	20 120		14 317
5 170		7 1,134	30 1,545		49 2,849	17 630	59 3,479	5 245	3 90	14 923
2 85		2 150	3 153		7 388		7 388			
		1 115	14 504	2 50	17 669		17 669		40	2
	1 502				9 502	9 5	10 507	19 225	8 1,635	4 35
						5 320	5 320			
		4 980	8 421		12 1,401	17 562	29 1,963	26 320	2 65	1 7
7 255	1 502	14 2,379	60 2,709	2 50	84 5,896	92 4,842	176 10,737	70 910	14 1,830	36 1,305
1 50			8 490		9 540	350 17,021	359 17,561	6 210	1 40	12 1,424
6 647	4 20		11 600		21 1,267	39 1,928	60 3,195		9 690	2 13
2 60			2 120		4 180	11 231	11 411		4 152	
2 170			4 205		6 375	16 482	22 857		5 150	4 1,610
542		6 353	9 368		28 1,263	65 2,676	91 3,939		1 35	23 917
22 1,469	4 20	6 353	34 1,783		68 3,625	481 22,338	547 25,963	6 210	17 1,067	41 3,961
77 11,595	18 14,230	94 13,851	274 14,850	8 890	471 55,716	3,235 95,939	3,706 151,655	719 25,413	154 19,631	1,017 228,225
85 26,532	† †	85 11,428	251 14,018	9 9,240	430 61,218	3,080 88,563	3,510 149,781	351 13,411	179 22,316	813 160,973

WARTIME MINE SHOP ASSOCIATION

OLIVER HALL—*Chairman*

The Porcupine camp was on war work in 1941, 1942, 1943 and 1944 and had some orders to finish in 1945. All told, this mining camp took 190 orders and the work completed to date totals \$1,880,411. All the mines participated in this work. The work in this camp was organized by Charles Kemsley, Mechanical Superintendent of Dome Mines. The mechanical superintendents all co-operated. Most of the work was for merchant shipping.

The work in the Kirkland Lake camp totalled a similar amount. Their total for the same period and up to the end of February, 1945 was \$1,764,420.67. Twelve mines carried on work on steam generators, steering engines, pumps, etc., for merchant shipping. Lake Shore mines organized the reception and distribution of orders, and Mr. W. Purdy of Lake Shore mine and all the mechanical superintendents co-operated.

Consolidated Smelters built large engines for naval service and the International Nickel Company built the standards for naval guns.

All told, the war work in the mine shops has totalled about \$4,250,000 (March, 1945).

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production, Prices, etc.

Definition of the Industry—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is designated “The Auriferous Quartz Mining Industry” and in which industry gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of Canadian gold production.

Canadian production of fine gold in 1943 totalled 3,651,301 troy ounces valued at \$140,575,088 compared with 4,841,306 troy ounces worth \$186,390,281 in 1942. The quantity of gold recovered from Canadian ores, of all kinds, during the year under review, was the smallest since 1936 and reflected the strain borne by a nation that had experienced over four years of total war. Many employees of both auriferous quartz and base metal mines have entered the various branches of the armed forces, and the manufacture of certain equipment or materials necessary for the development of new gold mines or expansion in older one has been considerably restricted or the products of such manufacture diverted for more urgent use in our all out war effort.

Ontario, Quebec and British Columbia retained their positions as the most important gold producing provinces; of the total gold produced in the Dominion in 1943, Ontario contributed 58 per cent, Quebec 25·3 per cent and British Columbia 6·6 per cent. The balance of the year’s output came from deposits located in Saskatchewan, Manitoba, Northwest Territories, Yukon, Nova Scotia and Alberta.

Canadian gold production in 1943, according to the nature of the ores from which the metal was recovered, was as follows: placer deposits, 1·45 per cent, auriferous quartz ores, 82·66 per cent; copper-gold-silver ores, 13·85 per cent; nickel-copper ores, 1·53 per cent, and silver-lead and other ores, 0·51 per cent.

Table 37. —Production of New Gold in Canada, by Provinces and Sources, 1942 and 1943
(Gold at \$20·671834 per fine ounce)

	1942		1943	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion.....	* 12,989	268,506	4,129	85,354
Estimated exchange equalization on gold produced.....		231,570		73,613
Total Value—Canadian Funds.....		500,076		158,967
QUEBEC—				
In anode copper, in ores shipped and in gold bullion.....	1,092,388	22,581,663	922,533	19,070,449
Estimated exchange equalization on gold produced.....		19,475,275		16,447,072
Total Value—Canadian Funds.....		42,056,938		35,517,521
ONTARIO—				
*Porcupine Area—In gold bullion.....	1,308,590	27,050,955	1,020,977	21,105,467
*Kirkland Lake—In gold bullion (a).....	756,388	15,635,927	635,393	13,134,739
*Other gold mines—In gold bullion.....	627,646	12,974,594	405,007	8,372,237
Copper-nickel and other ores.....	71,195	1,471,731	55,838	1,154,274
Total.....	2,763,819	57,133,207	2,117,215	43,766,717
Estimated exchange equalization on gold produced.....		49,273,825		37,746,060
Total Value—Canadian Funds.....		106,407,032		81,512,777

NOTE: The estimated average price of a troy ounce of fine gold in Canadian funds was \$38.50 in both 1942 and 1943.

*Includes relatively small amounts of gold contained in slags, and ore shipped.

(a) Includes production in Larder Lake area.

Table 37.—Production of New Gold in Canada, by Provinces and Sources, 1942 and 1943
Gold at \$20·671834 per fine ounce—Concluded

	1942		1943	
	Fine troy ounces	\$	Fine troy ounces	\$
MANITOBA—				
In gold bullion, ores shipped and in blister copper.....	136,226	2,816,041	91,775	1,897,158
Estimated exchange equalization on gold produced.....		2,428,660		1,636,179
Total Value—Canadian Funds.....		5,244,701		3,533,337
SASKATCHEWAN—				
In ores shipped to Canadian smelters, crude placer gold and gold bullion.....	178,871	3,697,592	174,090	3,598,760
Estimated exchange equalization on gold produced.....		3,188,941		3,103,705
Total Value—Canadian Funds.....		6,886,533		6,702,465
ALBERTA—				
In alluvial gold.....	34	703	21	434
Estimated exchange equalization on gold produced.....		606		374
Total Value—Canadian Funds.....		1,309		808
BRITISH COLUMBIA—				
In alluvial gold.....	26,323	544,145	11,680	241,447
In gold bullion.....	275,178	5,688,434	136,340	2,818,397
In base bullion and in slag and ores exported.....	172,838	3,572,878	93,326	1,929,220
Total.....	474,339	9,805,457	241,346	4,989,064
Estimated exchange equalization on gold produced.....		8,456,595		4,302,757
Total Value—Canadian Funds.....		18,262,052		9,291,821
YUKON—				
In alluvial gold.....	83,198	1,719,855	41,157	850,790
In ores shipped.....	48	992	3	62
Total.....	83,246	1,720,847	41,160	850,852
Estimated exchange equalization on gold produced.....		1,484,124		733,808
Total Value—Canadian Funds.....		3,204,971		1,584,660
NORTHWEST TERRITORIES—				
In ores shipped.....	723	14,946	5	103
In gold bullion produced.....	98,671	2,039,710	59,027	1,220,196
Total.....	99,394	2,054,656	59,032	1,220,299
Estimated exchange equalization on gold produced.....		1,772,013		1,052,433
Total Value—Canadian Funds.....		3,826,669		2,272,732
Total for Canada.....	4,841,306	100,078,674	3,651,301	75,479,087
Total estimated exchange equalization on gold produced.....		86,311,607		65,096,001
Grand Total Value, including exchange.....		186,390,281		140,575,088

Table 38.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1931-1943

Month	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940 1943
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
January.....	20·71	24·24	23·64	33·05	34·95	35·06	35·01	34·99	35·30	38·50
February.....	20·67	23·67	24·74	35·29	35·05	35·18	35·01	35·00	35·19	38·50
March.....	20·67	23·11	24·78	35·08	35·40	35·11	34·98	35·05	35·13	38·50
April.....	20·68	22·98	25·33	34·93	35·18	35·13	34·95	35·15	35·15	38·50
May.....	20·68	23·38	27·75	34·94	34·95	35·00	34·94	35·22	35·13	38·50
June.....	20·73	23·83	28·24	34·73	35·05	35·09	35·02	35·36	35·07	38·50
July.....	20·74	23·73	30·58	34·59	35·08	34·91	35·05	35·24	35·06	38·50
August.....	20·73	23·61	30·09	34·19	35·09	35·00	35·00	35·12	35·01	38·50
September.....	21·55	22·88	31·79	34·18	35·28	34·99	35·00	35·12	37·21	38·50
October.....	23·22	22·65	31·48	34·27	35·49	34·99	34·99	35·32	38·43	38·50
November.....	23·22	23·73	32·68	34·16	35·37	34·95	34·98	35·25	38·50	38·50
December.....	25·01	23·85	32·14	34·57	35·33	34·98	34·93	35·28	38·50	38·50
Yearly average.....	21·55	23·47	28·60	34·50	35·19	35·03	34·99	35·17	36·14	38·50

NOTE: Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is noted elsewhere in this report. At December 31, 1943, the price paid by the United States Treasury for gold purchased by the Mint continued at \$35 per troy ounce of fine gold, less $\frac{1}{2}$ of 1 per cent. Actual payment by the United States Treasury for gold in imported and domestic ore or concentrate was at 99·75 per cent of the price quoted by the Treasury, which, at the close of 1943, was equal to \$34·9125 per ounce.

Table 39.—Production of Gold in Canada, by Principal Mines, 1943

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	tons	tons	tons	fine oz.	tons	
NOVA SCOTIA—						
Avon Gold Mines Ltd.....	350		350	335	100	(a) (b)
Consolidated Mining & Smelting Co. of Canada (Holman).....	8,979		9,004	3,533	40	(a) (c)
Queens Mines Ltd.....	5,405	(d)	(d)	843	120	(a)
Total Nova Scotia.....				*4,129		

FOOTNOTES—

(a) Amalgamation.

(b) Operations ceased January 31.

(c) In addition, 42 ounces of gold were contained in concentrates produced but not treated.

(d) Not reported.

(*) Receipts at Royal Canadian Mint, Ottawa.

QUEBEC—						
Beattie Gold Mines (Quebec) Ltd.....	299,500	28,921	270,579	28,680	1,800	(c) (d) (e)
Bellefleur Quebec Mines Ltd.....	131,363	20,723	110,640	42,794	300	(c)
Canadian Malartic Gold Mines Ltd.....	323,697		323,697	32,284	1,000	(c)
Central Cadillac Mines Ltd.....	(i)	(i)	(i)	3,263	(i)	(j)
East Malartic Mines Ltd.....	315,088		315,088	49,014	1,500	(c)
Francoeur Gold Mines Ltd.....	63,852		63,852	10,526	250	(c)
Lamaque Mining Co. Ltd.....	269,535		269,535	75,969	1,200	(c) (g)
Lapa Cadillac Gold Mines Ltd.....	24,185		23,481	5,535	250	(a) (c)
Malartic Gold Fields Ltd.....	226,855		226,855	43,679	750	(c)
McWatters Gold Mines Ltd.....	39,287	684	38,603	5,274	150	(c)
Mic Mac Mines Ltd.....	139,172		139,009	20,375	650	(a) (b)
O'Brien Gold Mines Ltd.....	66,572		66,409	25,666	200	(a) (c) (d)
Poulos, Thos. (Eureka Mining Reg.).....	1,200		1,200	2,850	10	(a)
Perron Gold Mines Ltd.....	142,372	25,312	117,060	20,375	360	(c)
Powell Rouyn Gold Mines Ltd.....	272,648		266,069	34,549	450	(h)
Senator-Rouyn Ltd.....	98,022		96,073	14,435	300	(c)
Sisacoe Gold Mines Ltd.....	365,621	45,507	320,114	40,618	1,000	(a) (c)
Sladen Malartic Mines Ltd.....	223,619		223,743	21,345	700	(c)
Sigma Mines (Quebec) Ltd.....	336,098		336,098	64,119	1,100	(c) (g)
Stadacona Rouyn Mines Ltd.....	137,662		137,662	22,444	500	(c)
Sullivan Cons. Mines Ltd.....	191,679	40,746	150,933	35,516	500	(a) (c)
West Malartic Mines Ltd.....	93,345		93,340	11,305	300	(c)
Copper-gold-silver and other ores.....				302,046		
Total Quebec.....				922,533		

FOOTNOTES—

(a) Amalgamation.

(b) Auriferous copper concentrates shipped to smelter; in addition, 100 ounces gold contained in concentrates not yet shipped.

(c) Cyanided.

(d) In addition, shipped crude arsenic.

(e) Milling suspended from June 20.

(f) Gold recovered as precipitate and also in lead and zinc concentrates exported.

(g) Also shipped scheelite.

(h) Crude ore shipped to smelter.

(i) Data not available.

(j) Closed April 30.

ONTARIO—						
<i>Porcupine District</i>						
Aunor Gold Mines Ltd.....	159,436		159,436	49,720	300	(c)
Bonetel Gold Mines Ltd.....	31,351	3,553	27,798	4,299		(c)
Broulaur Porcupine Mines Ltd.....	131,747	13,740	118,007	28,609	350	(c)
Buffalo Ankerite Gold Mines Ltd.....	261,484	1,100	260,271	49,151	1,300	(c)
Coniaurum Mines Ltd.....	111,455		111,455	30,842	600	(c)
Delnite Mines Ltd.....	126,446		125,887	21,271	520	(c) (b)
Dome Mines Ltd.....	525,900		525,900	149,641	1,700	(a) (c)
Hallnor Mines Ltd.....	105,544		105,544	37,918	400	(c)
Hollinger Cons. Gold Mines Ltd. (Ross).....	85,125		85,221	14,877	300	(c)
Hollinger Cons. Gold Mines Ltd. (Timmins).....	1,076,459		1,078,946	282,356	3,900	(c) (b)
Hoyle Gold Mines Ltd.....	108,944	3,286	105,606	9,731	600	(a) (c) (d)
McIntyre Porcupine Mines Ltd.....	682,706		668,700	192,869	2,500	(c)
Moneta Porcupine Mines Ltd.....	14,101	13	14,088	5,928	175	(c) (e)
Famour Porcupine Mines Ltd.....	525,557		525,557	54,073	1,600	(c)
Paymaster Cons. Mines Ltd.....	143,581		138,531	29,504	600	(c)
Preston East Dome Mines Ltd.....	248,766		247,026	59,215	1,000	(a) (c) (b)
<i>Kirkland Lake District</i>						
Bidgood Kirkland Gold Mines Ltd.....	49,965		49,835	14,378	125	(c)
Kirkland Lake Gold Mining Co. Ltd.....	83,987		83,987	30,863	400	(c)
Lake Shore Mines Ltd.....	293,398		293,398	133,906	2,300	(c)
Macassa Mines Ltd.....	103,230		103,259	42,854	400	(c)
Sylvanite Gold Mine Ltd.....	148,749		148,190	52,515	600	(c)
The Teck-Hughes Gold Mines Ltd.....	100,705		100,705	32,456	600	(c)
Toburn Gold Mines Ltd.....	43,174	2,269	40,905	15,798	174	(c)
Upper Canada Mines Ltd.....	98,826		98,826	29,848	250	(c)
Wright Hargreaves Mines Ltd.....	225,710		225,710	113,343	1,200	(c)

Table 39.—Production of Gold in Canada, by Principal Mines, 1943—Continued

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	tons	tons	tons	fine oz.	tons	
<i>Larder Lake District</i>						
Chesterville Larder Lake Gold Mining Co. Ltd.	196,687		196,687	23,264	700	(c)
Kerr-Addison Gold Mines Ltd.	674,487		674,487	130,192	2,000	(c) (b)
Omega Gold Mines Ltd.	109,846		109,846	15,446	500	(c)
<i>Matachewan District</i>						
Hollinger Cons. Gold Mines Ltd. (Young-Davidson)	192,701		192,727	20,008	1,050	(c)
Matachewan Consolidated Mines Ltd.	250,179		249,779	18,713	1,000	(c)
<i>Sudbury District</i>						
Jerome Gold Mines Ltd.	107,608		107,608	18,641	500	(c) (f)
<i>Thunder Bay District</i>						
Hard Rock Gold Mines Ltd.	122,503	24,734	97,373	24,064	500	(c) (g)
Leitch Gold Mines Ltd.	35,127	7,678	27,438	21,884	90	(a) (b) (e)
Little Long Lac Gold Mines Ltd.	104,707	3,868	88,890	26,180	300	(a) (b) (e)
Magnet Cons. Mines Ltd.	43,834	774	43,060	14,878	175	(a) (e) (h)
MacLeod-Cockshutt Gold Mines Ltd.	273,617	91,856	181,761	54,632	650	(e) (i)
<i>Kenora and Rainy River District</i>						
Kenwest Gold Mines Ltd.	3,119		3,119	437	125	(c) (j)
Wendigo Gold Mines Ltd.	309	8	301	1,064	80	(a) (k) (n)
<i>Patricia District</i>						
Berens River Mines Ltd.	53,255		53,255	16,135	225	(l) (n)
Central Patricia Gold Mines Ltd.	104,451		104,451	37,001	400	(c)
Cochonour Willans Gold Mines Ltd.	55,663		55,663	28,694	200	(a) (c) (m) (n)
Hasaga Gold Mines Ltd.	146,111	25,923	120,318	18,353	350	(c)
Madsen Red Lake Gold Mines Ltd.	144,796		144,792	34,259	400	(a) (e)
McKenzie Red Lake Gold Mines Ltd.	103,449	17,476	85,073	24,672	250	(c) (b)
McMarnac Red Lake Gold Mines Ltd.	32,073		32,073	7,213	75	(o) (e) (n)
Pickle Crow Gold Mines Ltd.	81,535	10,740	70,575	34,464	400	(a) (e) (b)
Uchi Gold Mines Ltd.	14,614		14,614	3,172	750	(a) (e) (o)
Nickel-copper mines				55,776		
Other mines				2,108		
Total Ontario				2,117,215		

FOOTNOTES—

- (a) Amalgamation.
 (b) Also shipped scheelite.
 (c) Cyanided.
 (d) Milling suspended July 11.
 (e) Operations ceased June 30.
 (f) Suspended milling August 31.
 (g) Includes 1,541 ounces recovered from 3,906 tons tailings.
 (h) Operations suspended October 29.
 (i) Includes 278 ounces recovered from 1,980 tons tailings.
 (j) Suspended mining May 31.
 (k) Operations ceased January 5.
 (l) Gold content of precipitate and lead concentrates shipped; in addition, there is a relatively high recovery of silver and lead.
 (m) In addition, there were approximately 545 ounces gold in concentrates produced but not shipped.
 (n) Concentrates smelted.
 (o) Operations ceased March 8.

<i>MANITOBA—</i>						
God's Lake Gold Mines Ltd.	49,294		49,294	13,677	200	(a) (b) (c)
San Antonio Gold Mines Ltd.	164,390		164,307	48,508	550	(a) (c)
Copper-gold-silver and other mines				29,590		
Total Manitoba				91,775		

FOOTNOTES—

- (a) Amalgamation.
 (b) Operations ceased August 27.
 (c) Cyanided.

<i>SASKATCHEWAN—</i>						
Copper-gold-silver and other ores				174,090		

<i>ALBERTA—</i>						
Placer gold				21		

Table 39.—Production of Gold in Canada, by Principal Mines, 1943—Concluded

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	tons	tons	tons	fine oz.	tons	
BRITISH COLUMBIA—						
Bralorne Mines Ltd.....	125,357	6,895	118,462	73,817	150	(a) (b) (i)
Cariboo Gold Quartz Mining Co. Ltd.....	35,822		38,249	16,269	350	(a) (c)
Gold Belt Mining Co., Ltd.....	14,839		14,839	5,785	150	(c) (c)
Hedley Mascot Gold Mines Ltd.....	47,669		47,849	13,122	200	(c) (d) (f)
Island Mountain Mines Co. Ltd.....	22,635		22,635	10,202	150	(c)
Kelowna Exploration Co. Ltd.....	67,640		67,640	23,344	275	(d) (g)
Kootenay Belle Gold Mines Ltd.....	2,744		2,744	1,983	150	(a) (c) (i)
Pioneer Gold Mines of B.C. Ltd.....	30,245	3,810	26,435	11,261	300	(c)
Privateer Mine Ltd.....	19,452	5,655	14,106	13,485	90	(a) (c) (h)
Prident Gold Mines Ltd.....	30,285		30,285	13,079	150	(c)
Sheep Creek Gold Mines Ltd.....	93,003		(i)	(i)	500	(d)
Silbak Premier Mines Ltd.....			(k) 754,202	11,680		
Placer gold.....				18,137		
Copper-gold ores.....				29,182		
Silver-lead and other ores.....						
Total British Columbia.....				241,346		

FOOTNOTES—

- (a) Amalgamation.
 (b) Also shipped scheelite.
 (c) Cyanided.
 (d) Concentrates shipped to smelter.
 (e) Milling suspended August 31.
 (f) Ore also contains copper and arsenic; milling ceased September 30.
 (g) Ore also contained copper and arsenic; in addition, 16,966 tons tailings treated.
 (h) Operations suspended November 15.
 (i) Data not available.
 (j) Operations ceased June 15.
 (k) Cubic yards material handled (estimate).

YUKON—						
Placers.....			(a) 7,273,915	41,157		
Silver-lead ores.....				3		
Total Yukon.....				41,160		

FOOTNOTES—

- (a) Cubic yards—estimated.
 (b) In ores exported.

NORTHWEST TERRITORIES—						
Cons. Mining & Smelting Company of Canada Ltd. (Con).....	33,713		33,713	20,357	350	(a) (b) (c) (d)
Negus Mines Ltd.....	27,358	5,019	22,333	19,080	60	(a) (c)
Ryeon Mines Ltd.....	4,608		4,608	2,620		(e)
Thompson-Lundmark Gold Mines Ltd....	23,545		23,545	16,814	100	(a) (c) (f)
Other gold mines.....				161		
Total Northwest Territories.....				59,032		

FOOTNOTES—

- (a) Amalgamation.
 (b) Milling suspended September 11.
 (c) Cyanided.
 (d) In addition, there were 2524.6 tons of concentrates assaying 1.52 ounces gold per ton produced but not treated.
 (e) Mining suspended September 11; ore milled at Con mine.
 (f) Operations suspended September 20.

CANADA—						
Total Canada.....				3,651,301		

Table 40.—Gold Recovered in Canada According to Nature of Ore, by Provinces, 1938-1945

Year and Province	Placer gold	Auriferous quartz ores (†)	Copper-gold-silver ores	Nickel-copper ores	Silver-lead and other ores	Total
	oz.	oz.	oz.	oz.	oz.	oz.
1938						
Nova Scotia.....		26,560				26,560
Quebec.....		576,034	305,229			881,263
Ontario.....		2,816,250		80,222	5	2,896,477
Manitoba.....		103,291	82,415			185,706
Saskatchewan.....	81		49,940			50,021
Alberta.....	305					305
British Columbia.....	46,207	523,153	22,267		13,990	605,617
Northwest Territories.....		6,794			6	6,800
Yukon.....	71,303				1,065	72,368
Total Canada.....	117,896	4,052,082	459,851	80,222	15,066	4,725,117
1939						
Nova Scotia.....		28,071			1,872	29,943
Quebec.....		680,410	272,967			953,377
Ontario.....		3,008,976		77,094	6	3,086,076
Manitoba.....		107,024	73,851			180,875
Saskatchewan.....	63	8,555	68,502			77,120
Alberta.....	359					359
British Columbia.....	39,797	534,938	36,883		15,352	626,970
Northwest Territories.....		51,911			3	51,914
Yukon.....	85,572	1,146			1,027	87,745
Total Canada.....	125,791	4,421,031	452,203	77,094	18,260	5,094,379
1940						
Nova Scotia.....		22,219				22,219
Quebec.....		751,942	267,233			1,019,175
Ontario.....		3,170,823		90,863	2	3,261,688
Manitoba.....		76,897	75,898			152,795
Saskatchewan.....	60	20,863	81,993			102,925
Alberta.....	215					215
British Columbia.....	32,128	509,260	54,731		20,892	617,011
Northwest Territories.....	3	55,156				55,159
Yukon.....	79,905	292			261	80,458
Total Canada.....	112,320	4,607,452	479,355	90,863	21,155	5,311,145
1941						
Nova Scotia.....		19,170				19,170
Quebec.....	9	813,156	276,172			1,089,339
Ontario.....		3,116,303		77,960	45	3,194,308
Manitoba.....		80,330	70,223			150,553
Saskatchewan.....	57	24,631	113,327			138,015
Alberta.....	215					215
British Columbia.....	35,020	516,941	35,010		21,232	608,203
Northwest Territories.....	39	74,378				74,417
Yukon.....	70,847				112	70,959
Total Canada.....	106,187	4,644,911	494,732	77,960	21,389	5,345,179
1942						
Nova Scotia.....		12,989				12,989
Quebec.....		811,714	280,580		94	1,092,388
Ontario.....		2,692,828		70,861	130	2,763,819
Manitoba.....		85,193	51,033			136,226
Saskatchewan.....	9	15,141	163,721			178,871
Alberta.....	34					34
British Columbia.....	26,323	418,048	19,892		10,076	474,339
Northwest Territories.....		99,394				99,394
Yukon.....	83,198				48	83,246
Total Canada.....	109,564	4,135,307	515,226	70,861	10,348	4,841,306
1943						
Nova Scotia.....		4,129				4,129
Quebec.....		625,429	284,112		12,992	922,533
Ontario.....		2,061,376		55,776	62	2,117,215
Manitoba.....		62,254	29,521			91,775
Saskatchewan.....	4		174,086			174,090
Alberta.....	21					21
British Columbia.....	11,680	205,850	18,137		5,679	241,346
Northwest Territories.....		59,032				59,032
Yukon.....	41,157				3	41,160
Total Canada.....	52,858	3,018,074	505,857	55,776	18,736	3,651,301
Total Six Years.....	624,616	24,878,557	2,907,224	452,776	101,954	28,968,427

† Contains a relatively small quantity of gold recovered from certain complex ores (lead, copper, etc.) which are difficult to classify. This applies especially to British Columbia ores.

* Includes production of Golden Manitou mine which was classified in previous years as auriferous quartz.

Table 41.—Gold Production of the World(a)—(In fine ounces)—1938 and 1943

Country	1938	1943
(Taken from American Bureau of Metal Statistics)		
NORTH AMERICA—		
United States.....	5,008,178	1,365,223
Canada.....	4,725,117	3,652,263
Mexico.....	923,819	800,000
Newfoundland.....	24,104	20,000
Total North America.....	10,681,218	5,837,486
CENTRAL AMERICA AND WEST INDIES.....	164,000	300,000
SOUTH AMERICA—		
Brazil.....	174,041	250,000
Chile.....	294,092	174,000
Colombia.....	520,715	570,092
Ecuador.....	74,042	100,000
Peru.....	260,319	230,000
Guiana—British.....	38,482	(d)
Dutch.....	12,000	(d)
French.....	40,605	(d)
Venezuela.....	114,978	110,000
Other South America.....	40,000	(d)
Total South America.....	1,569,274	1,439,092
EUROPE—		
Czechoslovakia.....	10,000	
France.....	87,354	
Yugoslavia.....	78,301	
Romania.....	172,453	
Russia and Siberia.....	* 5,800,000	
Sweden.....	234,116	
Other Europe.....	45,000	
Total Europe.....	6,427,224	* 4,500,000
OCEANIA—		
New South Wales.....	88,708	55,000
Queensland.....	151,432	* 100,000
Victoria.....	144,243	55,000
Western Australia.....	1,167,792	546,470
Tasmania.....	22,200	* 20,000
New Guinea.....	236,897	
New Zealand.....	152,050	150,000
Fiji.....	92,400	90,000
Other Oceania (c).....	52,600	* 40,000
Total Oceania.....	2,107,822	1,056,470
ASIA—		
British India.....	322,397	252,000
China, including Manchuria.....	188,000	(d)
Korea.....	948,447	(d)
Netherland India.....	76,300	(d)
Formosa.....	* 60,000	(d)
Japan.....	* 760,000	(d)
Other Asia.....	104,000	(d)
Total Asia.....	2,459,144	* 1,600,000
AFRICA—		
Belgian Congo.....	473,246	(d)
French West Africa.....	127,153	(d)
Kenya.....	69,436	(d)
Madagascar.....	13,760	(d)
Rhodesia.....	815,191	665,000
British West Africa (b).....	729,754	600,000
Tanganyika.....	82,168	110,000
Transvaal, Cape Colony and Natal.....	12,161,392	12,800,021
Other Africa.....	150,000	(d)
Total Africa.....	14,622,100	15,080,021
Totals for World.....	38,030,782	29,813,069

(a) In compiling this table free use has been made of the reports of the United States Director of the Mint. Production of the Philippine Islands is included with the United States in this table.

(b) Comprising Gold Coast, Sierra Leone and Nigeria.

(c) Includes Papua.

(d) Not reported; estimate has been included in total.

* Conjectural.

Table 42.—Comparative Figures of Gold Production for the World Since the Discovery of America, also Production for Russia, Transvaal, United States and Canada

Year	Russia (a)	Transvaal since the commence- ment of Fields (i)	United States (f) (a)	Canada since the recording of production in 1858	(a) World since the discovery of America
	fine ounces	fine ounces	fine ounces	fine ounces	fine ounces
1493-1600.....					24,266,820
1601-1700.....					29,330,445
1701-1800.....					61,088,215
1801-1840.....					20,488,552
1841-1850.....			(c) 1,187,170		17,605,018
1851-1860.....				220,039	64,482,932
1861-1870.....			(d) 58,279,778	1,477,999	61,098,343
1871-1880.....			(e) 15,281,264	904,093	55,670,618
1881-1890.....		1,070,651	15,808,339	584,102	51,280,184
1891-1895.....		6,870,158	9,106,834	291,564	39,412,823
1896-1900.....		12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....		13,632,908	19,393,722	4,592,261	78,033,650
1906.....		5,792,823		556,415	19,471,080
1907.....		6,450,740		405,517	19,977,260
1908.....		6,056,266	22,993,218	476,112	21,422,244
1909.....		7,293,108		453,865	21,965,111
1910.....		7,527,108		493,707	22,022,180
1911.....		8,249,461	4,687,053	473,159	22,397,136
1912.....		9,107,512	4,520,719	611,885	22,605,068
1913.....	(g) 1,583,677	8,798,336	4,299,784	802,973	22,556,347
1914.....	1,733,914	8,394,322	4,572,976	773,178	21,652,833
1915.....	1,382,450	9,093,902	4,887,604	918,056	22,846,608
1916.....	1,089,885	9,296,618	4,479,057	930,492	22,032,542
1917.....	871,265	9,018,084	4,051,440	738,831	20,346,043
1918.....	554,588	8,418,292	3,320,734	699,681	18,588,127
1919.....	173,610	8,331,294	2,918,628	766,764	17,339,679
1920.....	73,045	8,158,226	2,476,166	765,007	16,146,830
1921.....	65,907	8,128,681	2,422,006	926,329	15,997,692
1922.....	191,614	7,009,767	2,363,075	1,263,364	15,496,859
1923.....	305,425	9,148,771	2,502,632	1,233,341	17,845,349
1924.....	546,550	9,574,918	2,528,900	1,525,382	18,619,481
1925.....	632,390	9,597,573	2,411,987	1,735,735	18,673,178
1926.....	760,605	9,954,762	2,335,042	1,754,228	19,117,568
1927.....	688,492	10,122,459	2,197,125	1,852,785	19,058,736
1928.....	385,800	10,354,157	2,233,251	1,890,592	18,885,849
1929.....	707,000	10,412,326	2,208,386	1,928,308	19,207,452
1930.....	1,501,083	10,716,349	2,285,603	2,102,068	20,903,736
1931.....	1,655,725	10,877,708	2,395,878	2,093,892	22,284,290
1932.....	1,938,000	11,557,858	2,449,032	3,044,387	24,098,676
1933.....	2,700,000	11,012,340	2,556,246	2,949,309	25,400,295
1934.....	3,555,000	10,479,194	3,091,183	2,972,074	27,372,374
1935.....	4,784,030	10,773,041	3,609,283	3,284,890	29,999,245
1936.....	(h) 6,500,000	11,335,092	4,357,394	3,748,028	32,930,554
1937.....	(h) 5,800,000	11,734,553	4,804,540	4,096,213	35,118,298
1938.....	(h) 5,800,000	12,161,375	5,089,811	4,725,117	37,703,334
1939.....	(h) 5,000,000	12,821,061	5,611,171	5,094,379	39,534,430
1940.....	(h) 4,000,000	14,037,741	(j) 6,003,105	5,311,145	41,067,101
1941.....	(b) 14,386,361	(l) 5,976,419	(n) 5,345,179	(k) 5,345,179	40,332,204
1942.....	(b) 14,120,617	(m) 3,741,806	(n) 4,841,306	(m) 4,841,306	36,000,000
1943.....	(b) 12,800,021	(p) 1,360,350		(o) 3,651,301	
Total.....		408,257,403	272,527,333	89,374,843	

(a) Supplied by United States Mint.

(b) Not available.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1880.

(f) Including Philippine Islands production received in United States. Data represent receipts at United States Mint's refineries assay offices.

(g) Data not available for preceding years. A revision by the United States Mint of estimated Russian gold production for the years 1913 to 1934 was made from United States consular reports, based principally on Soviet publications. While available data are quite indefinite and, in many instances, contradictory, it is believed that this revision more nearly represents actual production than data heretofore used. Figures for Russian production since 1937 supplied by American Bureau of Metal Statistics.

(h) Subject to revision. American Bureau of Metal Statistics.

(i) Annual Report—Department of Mines, Union of South Africa. 1941 and 1942 figures, Transvaal Chamber of Mines.

(j) Includes 1,140,126 fine ounces received from Philippines.

(k) Includes conjectural data for Russia.

(l) Includes 1,144,332 fine ounces from Philippine Islands.

(m) The Mining Journal, London—subject to revision.

(n) Includes 158,726 ounces received from Philippine Islands.

(o) Omitted due to incomplete data.

(p) United States Bureau of Mines—preliminary.

Table 43.—Precious Metals Consumed by the Jewellery and Silverware Industry in Canada, 1941 and 1942

Material	Cost at works	
	1941	1942
	\$	\$
Precious metals—		
Fine gold.....	2,343,880	2,789,986
Gold alloys.....	392,067	607,604
Fine silver.....	1,144,409	1,476,788
Silver alloys.....	646,528	754,421
Platinum.....	208,318	361,006
Old gold, jewellers' findings, waste and scrap for refining.....	1,318,882	1,324,155
Gold-filled wire and stock.....	510,646	557,245
Precious and semi-precious stones.....	732,748	697,703

GOLD EXPORTS

(Order-in-Council P.C. 207—January 13, 1944)

WHEREAS by Order in Council, P.C. 1150, dated May 17, 1932, regulations respecting the export of gold, whether in the form of coin or bullion, from the Dominion of Canada, were made under the authority of The Gold Export Act;

AND WHEREAS the said regulations were by Order in Council, P.C. 11498, dated December 22, 1942, continued in force until December 31, 1942;

AND WHEREAS in the opinion of the Minister of Finance it is expedient that the said regulations be continued in force beyond December 31, 1943;

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of the said "The Gold Export Act", is pleased to order that the provisions of the said Regulations be and they are hereby continued in force and effect until December 31, 1944, unless sooner rescinded by Order in Council.

NOTE.—Order in Council P.C. 1150, reads, in part, as follows—"The export of gold, whether in the form of coin or bullion (including ore, etc.), from the Dominion of Canada, is hereby prohibited, except in such cases as may be deemed advisable by the Minister of Finance, and under license to be issued by him.....".

GOLD IN CANADIAN TRADE STATISTICS

The publication of statistics showing the gross imports and exports of gold has been temporarily suspended as from September, 1939. Statistics for periods prior to that time have been accordingly revised to exclude all gold formerly included in the total of merchandise exports.

Statistics showing the net exports of non-monetary gold, including changes in stocks held under earmark, are published as a supplement to the trade figures, and are given below.

Exports of gold in Canadian trade statistics were distinguished in previous reports as between monetary and non-monetary. Monetary gold exports were described as those which entailed a reduction in the Dominion's monetary gold stocks. All other gold exported (classed as non-monetary) were shown as merchandise, and included with the total merchandise exports.

The fact that gold is a money metal gives it peculiar attributes which distinguish it from other commodities in trade. In particular, the movement of gold in international trade is determined almost exclusively by monetary factors. The amount of exports may fluctuate widely from month to month owing to other than ordinary trade or commercial considerations. In addition, gold is generally acceptable. It does not have to surmount tariff barriers and is normally assured a market at a relatively fixed price. For these reasons, provision was made in previous trade reports for a supplementary table showing exports from Canada excluding all gold.

It is further to be noted that gold does not move in international trade in any direct or normal relation to sales and purchases. It may be bought or sold abroad without moving in or out across the frontier, the sales or purchases in such cases being recognized by simply setting aside or "earmarking" the gold in the vaults of the central bank. Trade statistics deal only with physical movements, sales or purchases of gold which do not involve an actual movement being more properly regarded as an "invisible item" and taken care of in the "International Balance of Payments" statements. Changes in the Bank of Canada's stock of gold under earmark do not enter, therefore, into the trade statistics.

Table 44.—Trade of Canada, by Months, January, 1940 to December, 1945
(External Trade Branch, D.B.S.)

Balance of Trade (Excluding Gold)

Month	1940	1941	1942	1943
	\$	\$	\$	\$
January.....	+ 19,749,692	— 9,429,803	+ 10,180,853	+ 51,236,770
February.....	+ 1,272,518	+ 10,892,522	+ 48,641,010	+ 55,052,562
March.....	+ 6,731,244	— 5,023,835	+ 32,063,651	+ 60,460,065
April.....	— 1,286,841	+ 12,124,675	+ 27,884,655	+ 78,378,660
May.....	+ 10,226,810	+ 34,566,669	+ 88,179,951	+ 98,913,387
June.....	+ 20,916,821	+ 31,898,663	+ 58,170,621	+ 104,375,178
July.....	+ 11,966,940	+ 43,193,512	+ 59,824,137	+ 155,643,568
August.....	+ 14,523,715	+ 12,582,786	+ 45,905,877	+ 145,971,168
September.....	+ 16,491,368	+ 5,905,452	+ 81,170,827	+ 110,097,386
October.....	— 1,854,042	— 1,141,275	+ 72,774,449	+ 99,953,595
November.....	+ 16,120,464	+ 29,888,112	+ 82,758,195	+ 133,101,370
December.....	— 3,591,816	+ 26,205,413	+ 133,669,887	+ 173,091,680
Total.....	+ 111,266,873	+ 191,662,891	+ 741,224,113	+ 1,266,275,389

Net Exports of Non-Monetary Gold (Additional to Balance of Trade)

(Millions of Dollars)

January.....	21.6	19.2	15.1	13.9
February.....	12.4	14.7	16.6	12.8
March.....	16.2	19.7	16.1	12.8
April.....	18.0	14.3	14.1	13.5
May.....	16.9	16.1	15.5	12.5
June.....	15.1	18.4	16.8	12.2
July.....	15.9	17.3	16.3	10.0
August.....	17.6	12.6	13.1	10.2
September.....	16.5	21.2	15.0	11.8
October.....	18.9	17.4	19.3	11.3
November.....	16.6	15.4	12.6	8.8
December.....	17.3	17.4	13.9	12.2
Total.....	203.0	203.7	184.4	142.0

CANADIAN STOCKS OF GOLD METAL

Data relating to Canadian stocks of metallic gold since 1939 were not published. For information pertaining to these stocks prior to 1940, see previous annual gold mining reports as issued by the Bureau of Statistics.

Table 45.—World's Monetary Stocks of Gold at the Close of 1940, 1941 and 1942
(Subject to Revision)

(Compiled by the United States Mint from available data)

(Stated in United States money)

Country	Total Gold Stock Value, 1940 (c)	Per capita	Total Gold Stock Value, 1941 (e)	Per capita	Total Gold Stock Value, 1942 (e)	Per capita
	\$	\$	\$	\$	\$	\$
United States (d).....	21,991,102,000	165.98	22,736,557,000	167.62	22,728,255,000	168.85
Canada.....	7,251,000	0.63	5,000,000	0.44	5,629,000	0.49
Argentina.....	438,078,000	34.33	389,798,000	29.26	353,728,000	25.80
Belgium.....	736,000,000	88.03	734,000,000	87.42	735,000,000	89.02
Denmark.....	52,003,900	13.82	44,000,000	11.39	44,000,000	11.39
France.....	2,000,068,000	47.73	2,000,000,000	47.64	2,000,000,000	47.64
Germany.....	40,280,000	0.60	29,000,000	0.42	29,000,000	0.42
Great Britain.....	1,991,000	0.04	1,648,000	0.03	1,000,000	0.02
Italy.....	137,000,000	3.13	(a)	(a)	(a)	(a)
Netherlands.....	617,299,000	71.49	575,000,000	64.44	506,000,000	56.71
Norway.....	84,388,000	29.03	(a)	(a)	(a)	(a)
Poland.....	92,284,000	12.69	59,000,000	7.66	59,000,000	7.60
Portugal.....	157,400,000	8.01	182,000,000	13.49	241,000,000	12.09
Roumania.....	(a)	(a)	(a)	(a)	(a)	(a)
Russia (Soviet Union).....	(a)	(a)	(a)	(a)	(a)	(a)
Spain.....	(a)	(a)	(a)	(a)	42,000,000	1.60
Sweden.....	304,955,000	48.52	223,371,000	35.06	335,000,000	52.58
Switzerland.....	502,115,000	120.29	665,000,000	156.21	824,000,000	193.56
British India (ex. Burma).....	274,480,000	0.81	274,392,000	0.71	274,392,000	0.71
Japan (including Chosen, Taiwan, Kwantung).....	163,570,000	1.61	(a)	(a)	(a)	(a)
Netherlands East Indies.....	139,659,000	2.17	235,000,000	3.31	(a)	(a)
Egypt.....	52,000,000	3.10	52,000,000	3.10	112,208,000	4.85
Australia.....	16,683,000	2.43	(a)	(a)	(a)	(a)
New Zealand.....	23,087,000	14.41	23,000,000	14.08	23,087,000	14.13
Union of South Africa.....	352,713,000	36.00	366,000,000	35.39	634,457,000	60.30
Other countries.....	902,251,000	.....	(a)	(a)	(a)	(a)
Total.....	29,086,657,000 (b)	14.28	(c)	(c)	(c)	(c)

(a) Complete data omitted because of indefiniteness or unavailability.

(b) Population figures are principally supplied by United States Department of Commerce, 1938-40.

(c) Totals omitted due to the great number of instances in which data are not available.

(d) Includes Alaska, Hawaii and Puerto Rico.

(e) 1 ounce fine gold = \$35.

NOTE.—It is understood that material amounts of gold are not reported by several countries, such as amounts held in secret funds for stabilizing currencies and those hoarded or held outside of regularly reported stocks; also, Belgium, Canada, France, Germany and the United Kingdom do not include gold held in exchange equalization and similar accounts.

Table 46.—Average Commercial Ratio of Silver to Gold for each Specified Year Since 1700

(Supplied by United States Mint)

Year	Year	Year	Year
1700.....	14-81	1905.....	33.87
1750.....	14-55	1910.....	38.22
1800.....	15-68	1915.....	40.48
1850.....	15-70	1920.....	20.28
1875.....	16-64	1925.....	29.78
1880.....	18-05	1930.....	53.74
1885.....	19-41	1932.....	73.29
1890.....	19-75	1933.....	59.06
1895.....	31-60	1934.....	72.49
1900.....	33-33		
		1935.....	54.19
		1936.....	77.09
		1937.....	77.44
		1938.....	80.39
		1939.....	88.84
		1940.....	99.76
		1941.....	99.73
		1942.....	90.57
		1943.....	85.07*

* Estimate based on Canadian prices.

ORDER-IN-COUNCIL P.C. 1004—FEBRUARY 18, 1944

WHEREAS subsection one of section twenty-five of the Bank of Canada Act, Chapter forty-three of the Statutes of Canada, 1934, provides that the Bank shall sell gold to any person who makes demand therefor at the head office of the Bank and tenders the purchase price in legal tender, but only in the form of bars containing approximately four hundred ounces of fine gold;

AND WHEREAS by Order in Council P.C. 1238 dated February 15, 1943, passed under the provisions of sub-section two of said section twenty-five of the said Act, the operation of said subsection one of section twenty-five was suspended for a period of one year from and after March 10, 1943.

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of said subsection two of section twenty-five of the Bank of Canada Act is pleased to order that the operation of said subsection one of section twenty-five be and it is hereby suspended for a further period of one year from and after the tenth day of March, 1944, unless sooner rescinded by Order in Council.

ROYAL CANADIAN MINT

The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened up on January 2, 1908, was by 21-22 Geo. V, C. 48, constituted a branch of the Department of Finance and since December 1, 1931, has operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Bank of Canada in the form of bars, the rest being sold in convenient form to manufacturers.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and \$2½ gold pieces, 900 millesimal fineness (only \$10 and \$5 have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, 9/10th pure gold by weight, have been coined, the Canadian gold dollar thus containing 23·22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4.86 2/3, their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows: Each parcel of bullion for which a separate assay is required shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000, or appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—When the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal, 3½ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, 4½ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment, a charge not exceeding 10 cents the ounce, to be determined by the cost of the treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing by assay less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold

deposited with the Mint, and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay Office.

In addition to newly-mined Canadian gold there may be accepted at the Mint, gold (over 1 ounce troy fine) in the following forms: old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which, when of full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only, free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23.22 grains fine gold contained therein (equivalent to \$20.6718+ the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance. The rate to be paid, under Clause 4 of the Regulations, for silver in excess of one per centum of the weight of deposits received in any week, shall be the domestic price for silver for the basic period of September 15 to October 11, 1941, under the maximum price regulations of the Wartime Prices and Trade Board, namely 38.6 cents per ounce fine.

GOLD BULLION

Four thousand eight hundred and twenty-five deposits of gold bullion weighing 4,371,213 ounces were received at the Ottawa Mint from Canadian Mining Companies and sundry persons, and 165 deposits weighing 85,225 ounces received from the Dominion of Canada Assay Office, Vancouver, B.C. The total gross weight of gold deposited, including mutilated gold coin, was 4,456,438 ounces, containing by assay 3,616,959 ounces fine gold and 474,386 ounces fine silver. This shows a decrease as compared with the year 1942 of 1,655 deposits, gross weight 1,304,606 ounces, fine gold 995,023 ounces fine and fine silver 178,441 ounces fine.

The net amount paid by the Royal Canadian Mint to depositors by cheque was \$135,169,933.85. In addition, fine gold amounting to 5,835,849 ounces with a statutory value of \$120,638.10 was also issued in payment of gold deposits.

Postage collected for the Postmaster General on deposits shipped to the Mint postage collect amounted to \$21,965.02.

There were 722 rough gold deposits received at Vancouver and 4,825 deposits at Ottawa. Details relating to the origin of these deposits are shown in the following statement:

Source	Gross Weight	Fine Gold	Fine Silver
	Ounces	Ounces	Ounces
From Canadian mines—			
Ontario.....	2,613,308.050	2,110,420.496	275,272.27
Quebec.....	1,304,195.150	1,087,610.755	127,697.94
British Columbia.....	210,490.910	162,102.034	33,984.39
Manitoba.....	156,422.550	129,975.563	10,243.70
Yukon.....	52,709.610	41,156.866	8,810.11
Nova Scotia.....	4,448.625	4,130.962	144.70
Northwest Territories.....	86,065.025	64,586.135	14,363.50
Alberta and Saskatchewan.....	37.210	26.229	2.77
Total from mines.....	4,427,677.130	3,600,009.070	470,519.38
From jewellery and scrap.....	22,561.795	10,534.869	3,161.89
Foreign.....	1,526.300	1,470.261	28.96
Mutilated gold coin.....	0.264	0.237	.....
Grand Total.....	4,451,765.489	3,612,014.437	473,710.23

A detail of the fine gold issued in the form of trade bars to the Bank of Canada and granulated, sweep, proof plate and medals to sundry persons is shown hereunder:

	Ounces Fine
8,925 Trade Bars to Bank of Canada.....	3,559,549.683
Depositors.....	5,835.849
Sales to Manufacturers.....	62,684.078
Proof Plate.....	0.500
Medals.....	7.838
Sweep.....	17,662.016
	<u>3,645,739.964</u>

This total shows a decrease of 966,152.263 ounces fine as compared with the year 1942.

DOMINION OF CANADA ASSAY OFFICE, VANCOUVER, B.C.

Disbursements through this office in 1943 for the purchase of gold bullion amounted to \$2,414,688.10, as against \$5,628,080.26 for the calendar year 1942, a decrease of \$3,213,392.16.

Particulars as to source, weights, etc., are as under:

Source	Number of Deposits	Gross Weight	Fine Gold	Fine Silver
		Ounces	Ounces	Ounces
Yukon Territory.....	286	52,709.61	41,156.866	8,810.11
British Columbia.....	288	24,116.11	20,540.529	2,220.36
Alberta and Saskatchewan.....	3	28.76	22.115	1.76
Northwest Territories.....	1	3.40	2.997	0.23
Jewellery and dental scrap.....	144	3,694.62	1,589.807	507.78
	<u>722</u>	<u>80,552.50</u>	<u>63,312.314</u>	<u>11,630.24</u>

The above figures show a net decrease of 738 in the number of deposits, and of 84,205.603 ounces fine gold, as compared with the year 1942.

THE ALLUVIAL GOLD MINING INDUSTRY, 1943

In 1943, and for many years past, the greater part of the Canadian production of alluvial gold came from Yukon and British Columbia; relatively small quantities are also obtained in Alberta, Saskatchewan, and sometimes Quebec.

During the year under review, there were 52,837 troy ounces of fine gold recovered from crude gold obtained in Canadian alluvial mining operations. This represents a decrease of 48 per cent from the corresponding production in 1942 and reflects the increasing scarcity of men available for mining operations and prospecting.

Quebec and Ontario.—No placer gold mining operations were reported in 1943 from either Quebec or Ontario.

Saskatchewan and Alberta.—Placer gold has been mined along the North Saskatchewan River at various points between Rocky Mountain House, Alberta, and Prince Albert, Saskatchewan, from about 1860. Most activity has, however, been confined to the Alberta region, particularly in the vicinity of Edmonton. In 1943 no placer gold was recovered in Saskatchewan and only 21 troy ounces in Alberta.

British Columbia.—It has been found impractical to obtain complete reports for each individual placer gold mining operation in British Columbia, inasmuch as a considerable quantity of the crude placer gold is recovered annually by prospectors of no fixed abode who, in many instances, market their recoveries through local merchants and banks. Recoveries in 1943 were made chiefly from deposits located in the Atlin, Cariboo and Omineca districts; other districts to report production included Kamloops, Fort Steele, Revelstoke and Clinton. It was estimated that 11,680 troy ounces of fine gold were recovered from crude alluvial gold produced in British Columbia during 1943.

The number of alluvial gold operators reporting in 1943 totalled 39 as against 72 in 1942. The quantity of sands and gravels, including overburden and barren material moved during the year was estimated at 754,202 cubic yards compared with 1,884,887 cubic yards in the preceding year.

Yukon.—The following is from the annual report of G. A. Jeckell, Controller of Yukon Territory, for the fiscal year ending March 31, 1944:

"The total revenue collected in the Dawson Office on account of Mining Lands was \$53,435.50. Of this amount \$52,392.75 was from Placer, and \$1,042.75 was from Quartz. The decrease from last year's revenue is under the item of Royalty Export Tax on gold, and this decrease was due to the closing down of one-half of the gold dredges because of scarcity of labour. The revenue from mining fees alone shows a considerable increase over previous year. Comparative statements showing the revenue collected during the past years are attached.

"In the Mayo Mining Recorder's Office the total collections on account of mining were \$2,784.59. Of this amount \$1,218.98 was from placer, and \$1,565.61 was from Quartz. There was no revenue from royalty on silver.

"In the Whitehorse Mining Recorder's Office the total collections on account of mining were \$1,069.75, of which \$260.00 was from Placer, \$289.00 from Quartz, \$131.00 from Coal Leases, and \$389.75 from the sale of maps.

"The amount of placer gold mined during the year in the Territory on which Royalty Export Tax was paid was 52,853.58 ounces, produced as follows: 52,141.22 ounces, Dawson District; 530.50 ounces, Mayo District; and 181.86 ounces, Whitehorse District. The Royalty collected was \$19,820.17, as follows: Dawson District, \$19,552.92; Mayo District \$198.98; and Whitehorse District, \$68.27. The total gold production was 52,577.31 ounces less than for the previous year.

"In the Dawson District sixty-five new placer location grants, twenty-four relocation grants, and two thousand four hundred and nine renewal grants were issued, representing two thousand four hundred and ninety-eight placer claims in good standing. Three Dredging Leases were renewed covering twenty-three miles, and fees for the renewal of four hydraulic leases were paid.

"In the Mayo District one new placer location grant and one hundred renewal placer grants were issued, making one hundred and one claims in good standing.

"In the Whitehorse District three placer relocation grants, and twenty-two renewal placer grants were issued, making a total of twenty-five placer claims in good standing.

"The total number of placer claims in good standing in the Territory was two thousand six hundred and twenty-four.

"Fifty-seven Prospecting Leases were issued during the year representing a total of one hundred and forty-eight miles leased, being an increase of forty miles over previous year. There were twenty-nine new Leases issued, and twenty-eight Leases renewed. Divided as to Districts, ninety-five miles were in the Dawson District, thirty-nine miles in the Whitehorse District, and fourteen miles in the Mayo District."

The following is, in part, a review of the operations of the Yukon Consolidated Gold Corporation Limited:

"The winter of 1942-43 was one of the coldest on record. The low temperatures were not extreme but continued for long periods. Following a cold spell in December, when it reached a minimum of -55° , the New Year came in comparatively warm, with temperatures between zero and 8° above. However, after the first week in January, the weather changed and remained cold, -20° to -55° until after the middle of February, when there was a two-week period of moderately cold weather from 10° above to 20° below zero. Thereafter the weather was very characteristic of the time of the year, with day temperatures of zero to -15° and cold nights of more than 40° below, gradually moderating into Spring. The snowfall was average with the greater amount falling early in the season. In the Spring it disappeared slowly without bringing the streams to high stages. There was little wind other than that which usually occurs during the Spring months of March and April. The official date of the ice break-up in the Yukon River at Dawson was 7.48 p.m. on May 2. However, the ice moved only a short distance at this time and did not actually clear out until three days later, on the afternoon of May 5. The rainfall was greater than normal and was well distributed throughout the summer, making it an ideal season for mining operations. The summer heat, on the other hand, was slightly below normal, due in part to the overcast skies and rainfall. There was a two-week period of unusually warm weather in late June and early July, when many severe electrical and rain storms occurred. The Fall was very mild. There were slight frosts of plant killing intensity on the nights of

August 20 and 21, after which none occurred until September 20. The first severe frosts which affected mining operations happened on October 2, when the temperature dropped to 20°. Ideal dredging conditions existed well into December.

"The Company's hydro-electric power plant, which is located on the North Fork of the Klondike River, operated without interruption during the year. 18,395,400 k.w. were generated, of which 10,695,900 or 58.14 per cent were used by the Company in its mining operations; 4,301,788 k.w. were sold to The Dawson Electric Light and Power Company, Limited, for power and light in the City of Dawson; 1,306,900 k.w. were used in power plant operation; 2,090,812 k.w. were consumed in line loss. The power output was far below the capacity of the plant, due to lack of power demand. The water supply in both the North and South Forks of the Klondike River was above normal and equivalent at all times to plant capacity requirements. The Power Ditches, totalling 22 miles in length, were maintained in good condition. The Company's power distribution system was kept in operating order. Good service was maintained over both the Power Plant high tension and The Yukon Telephone Syndicate, Limited, creek telephone service lines.

"The only cold water thawing operation carried on during the 1943 season was on the Lower Klondike, No. 3 area, where the thawing of ground which had been given water the preceding season was completed. Work there was started late, May 17, as there was little preliminary work to be done, and the Fall dismantling of equipment was completed on October 16.

"Five dredges were operated during the 1943 season. Dredge No. 7, on Quartz Creek, was shut down before the end of the normal operating season in order to use the men on other dredges where the crews became too small for proper operation. One inactive dredge, No. 5, was totally destroyed by fire on the morning of July 12. Spring dredge repairs were started on March 27 and actual operations commenced on April 26, when Dredge No. 7 at Quartz Creek began digging. The other dredges started shortly thereafter and all were in operation by May 15. The dredging period extended to December 19, when the last dredge, No. 3, was closed down.

"The total production for the year from dredging operations was 34,304.353 fine ounces of gold valued at \$1,320,950.03 with gold at \$38.50 per ounce, Canadian and 7,676.69 fine ounces of silver valued at \$2,963.23. The combined value was \$1,323,923.26 and was taken from 6,867,514 cubic yards, which represented an average value of 19.28c per cubic yard dredged.

"The Clear Creek Placers, Limited, operated their 3-cubic foot pontoon type steel constructed dredge on the Left Fork of Clear Creek from June 1 to October 14, 1943. The total number of cubic yards of gravel dredged was 244,860. The total gold recovery was \$157,242.95. The average number of men employed was 16. The Company maintained and improved thirty-seven miles of road extending from McQuesten Airport on the Stewart River to the Dredge, at a cost of \$5,344.17. Of this amount, \$2,000.00 was furnished by the Yukon Territorial Government. The Company has also a complete drag line outfit on their property which they propose to operate when they can secure the necessary operating crew. This year they will confine operations to muck stripping so as to prepare an area in advance for dredging.

"The Holbrook Dredging Company opened up a Camp at the first of the season, but being unable to get an adequate operating crew, they did not start up the dredge, but did some repair work.

"The more important individual operations in the Dawson area were the hydraulic operations of Colbourne and Osborn on Homestake Gulch, a tributary of Bonanza Creek; and those of Hilson and Townshend and Franich and Brenner on Last Chance Creek. There were the usual summer mining operations on the older placer Creeks in the Klondike and Sixty-mile Districts by individual claim owners.

"In the Mayo District mining for placer gold and scheelite was continued on Dublin Gulch. The three operators there were assisted to some extent by the Government. Lunde and Swanson recovered sufficient scheelite and gold to make their operations successful, but Hugo Seaholm working farther up the Gulch was unsuccessful in developing a paying operation. 4,540 pounds of scheelite concentrate was recovered from these operations. It is reported that 565 ounces of gold was also recovered. Some placer mining was done on Higbet Creek by E. Middlecoff.

"No placer mining of any consequence was carried on in Southern Yukon.

"Representatives of several United States and Canadian Mining Companies visited the Territory during 1943. The parts of the Territory made accessible by the Alaska Highway received attention, but there were examinations made by several mining Companies in other parts of the Territory. The total number of prospectors was not large and records in the Mining Recorders' Offices reveal that only a comparatively few locations were made."

Table 47.—Summary Statistics of Alluvial Gold Mining in Canada, 1942 and 1943

	1942			1943		
	British Columbia (d)	Yukon (e)	(a) Saskatchewan and Alberta	British Columbia (d)	Yukon (e)	Alberta (a)
Number of firms and individual operators (f).....	72	8		39	4	
Capital employed..... \$	1,028,679	9,043,238		631,157	10,741,692	
Number of employees.....	155	316		62	175	
Salaries and wages paid..... \$	275,485	1,007,789		101,119	545,164	
Electricity generated for own use..... K.W.H.		24,624,400		260,000	10,695,900	
Electricity generated for sale.....		4,160,616			4,301,785	
Crude gold recovered..... crude ozs.	32,904	104,346	46	14,600	52,710	22
Platinum recovered..... ozs.	40			7		
Value of platinum recovered..... \$	1,528			269		
Quantity of material handled (f)..... cu. yds.	1,884,887	11,875,833		754,202	7,273,915	
Tungsten recovered (pounds concts.)..... lb.	Included	with Auriferous Quartz			12,083	
Length of ditches..... miles (b)	56	62		53	50	
Total gross value of alluvial products..... \$	1,005,758	3,314,217	1,655	451,000	1,598,164	808
Fuel and electricity used (purchased)..... \$	26,226	77,098		8,288	43,811	
Process supplies used.....	20,140	17,203		4,441	50,952	
Cost of freight and express on dust, nuggets, bullion, etc., shipped (c)..... \$	2,626	28,741		829	30,742	
Cost of smelter, refinery and mint treatment on material shipped (c)..... \$	4,991	29,610		2,240	16,455	
Total net value of alluvial products..... \$	951,775	3,161,565	1,655	435,202	1,456,204	808

(f) In addition to the number shown in the table, there were numerous small operators from whom returns were not obtainable; subject to revision.

(a) Recoveries for Alberta and Saskatchewan represent receipts of crude gold from Alberta and Saskatchewan at the Dominion Assay Office, Vancouver, B.C. No other statistics available.

(b) Includes flume; in use.

(c) Information not completely available.

(d) Value of crude gold in Canadian funds in 1942 was estimated to be \$30.52 per crude ounce. In 1943 it was \$30.87.

(e) Value of crude gold in Canadian funds in 1942 was estimated to be \$31.76 per crude ounce. In 1943 it was \$30.10.

(f) Includes some overburden or barren material.

Table 48.—Alluvial Gold Recovered and Quantity of Material Handled (†), 1925-1943

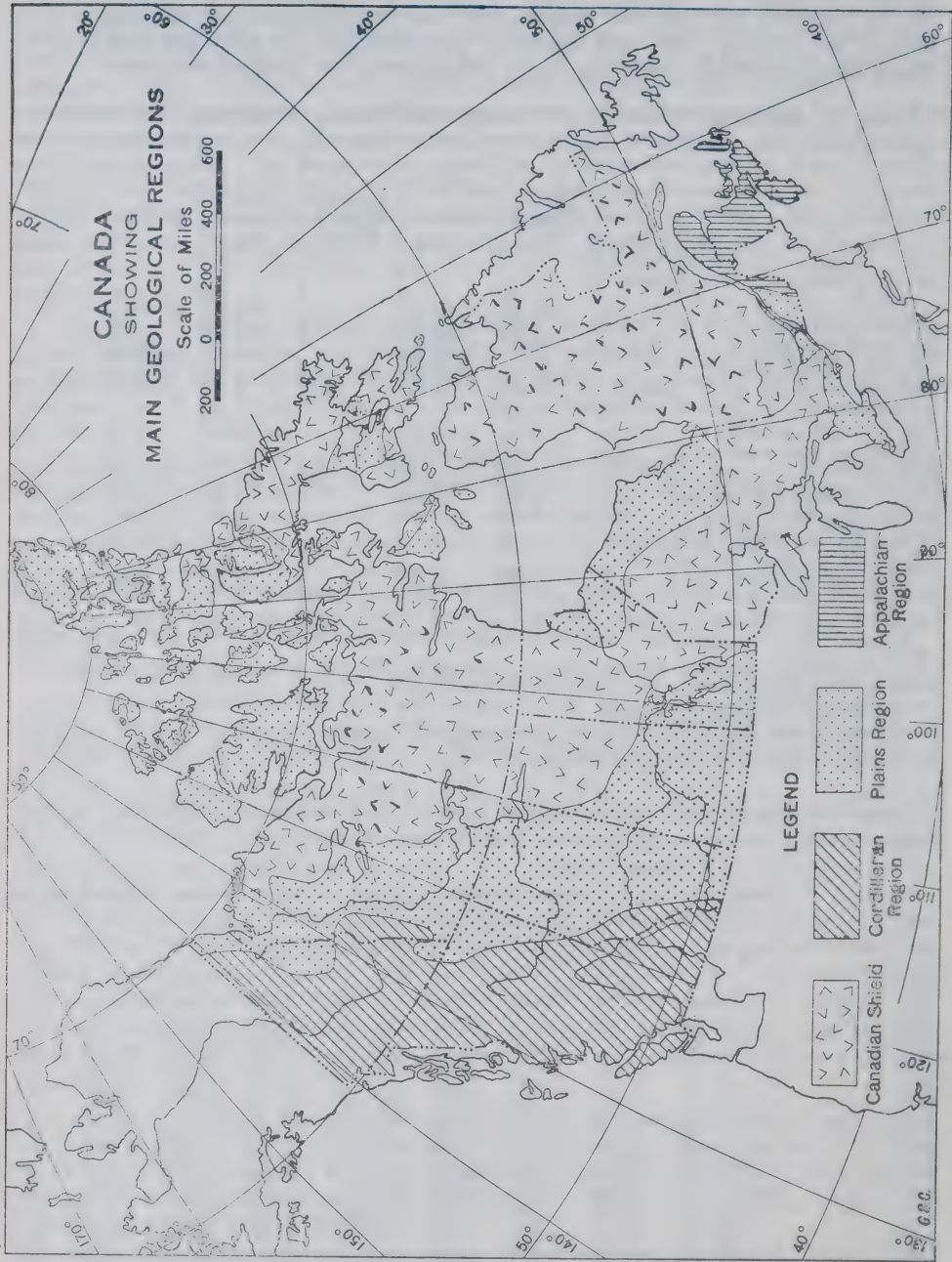
Year	BRITISH COLUMBIA				YUKON				Average value gold per fine oz.
	Material handled (*)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	Material handled (*)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	
	cu. yd.	fine oz.	fine oz.	\$	cu. yd.	fine oz.	fine oz.	\$	
1925.....	(a)	13,181	(a)	.....	3,103,692	47,817	0-0154	0-318	20-67
1926.....	1,237,090	16,730	0-0135	0-279	2,501,200	25,344	0-0101	0-208	20-67
1927.....	2,470,552	7,353	0-0029	0-0599	2,421,489	30,778	0-0127	0-262	20-67
1928.....	1,188,667	6,739	0-0057	0-1178	5,097,182	34,116	0-0067	0-1385	20-67
1929.....	1,336,390	5,158	0-0039	0-0806	4,500,000	35,678	0-0079	0-1633	20-67
1930.....	224,339	7,164	0-00319	0-0593	3,559,642	35,160	0-0099	0-2046	20-67
1931.....	1,587,271	13,741	0-0086	0-1853	4,914,638	44,061	0-0090	0-1939	21-55
1932.....	1,053,677	16,320	0-0155	0-3637	6,051,256	40,373	0-0067	0-1572	23-47
1933.....	1,326,721	19,142	0-0144	0-4118	5,605,522	39,174	0-0070	0-2002	28-60
1934.....	2,094,522	20,145	0-0099	0-3415	6,315,070	38,703	0-0061	0-2104	34-50
1935.....	1,855,937	24,744	0-0133	0-4080	5,442,861	35,705	0-0066	0-2322	35-19
1936.....	2,083,934	34,711	0-0166	0-5815	8,067,159	50,192	0-0062	0-2172	35-03
1937.....	3,472,025	43,322	0-0125	0-4373	8,298,514	46,679	0-0056	0-1959	34-99
1938.....	4,138,746	46,207	0-0112	0-3039	8,870,628	71,303	0-0050	0-2813	35-17
1939.....	4,779,407	39,797	0-0083	0-2999	11,152,198	85,572	0-0077	0-2782	38-14
1940.....	6,680,457	32,128	0-0048	0-1848	11,551,170	79,905	0-0069	0-2656	38-50
1941.....	4,587,103	35,020	0-0076	0-2926	8,792,220	70,847	0-0081	0-3119	38-50
1942.....	1,884,887	26,323	0-0139	0-5352	11,875,833	83,198	(b) 0-0070	0-2695	38-50
1943.....	754,202	11,680	0-0166	0-6006	8,028,117	41,157	(b) 0-0051	0-1904	38-50

(†) In addition, relatively small amounts of alluvial gold have been recovered in Quebec, Saskatchewan and Alberta, but complete data are not available; also, data relating to material handled, particularly those pertaining to small operations, are not complete and necessitate estimates in order to obtain totals.

(*) Data partly conjectural and includes some overburden and barren material.

(a) Not available.

(b) Fine gold received at Royal Canadian Mint (Vancouver Assay Office); previous year's figures represent estimated fine gold in crude gold recovered.



THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of the MacKenzie River. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller but very considerable proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon Territory—the gold production from this section includes relatively large quantities obtained from alluvial deposits. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

In 1943 mining operations were conducted at 156 auriferous quartz mines compared with 227 in 1942. The number of producing properties totalled 135 during the year under review as against 184 in the preceding year and 33 in 1923. From official returns received, it was estimated that 22 regular producing gold mines ceased or suspended production in 1943; of these, 1 was located in Nova Scotia, 3 in Quebec, 10 in Ontario, 1 in Manitoba, 5 in British Columbia and 3 in Northwest Territories.

The gross value of output of the entire auriferous quartz mining industry, including the value of all recoverable metals, gold, silver, etc., totalled \$116,833,847 in 1943 compared with \$160,564,783 in 1942. Of the 1943 total, \$79,799,131 represented recoveries from Ontario ores, \$24,088,645 from Quebec ores and \$8,094,301 from the gold mines of British Columbia.

Employees in the lode gold mining industry totalled 19,038 compared with 26,030 in 1942 and 5,524 in 1923. Salaries and wages paid amounted to \$40,665,283 as against \$54,388,872 in the preceding year. Fuel and purchased electricity consumed by the industry in 1943 totalled \$6,387,869 and the cost of explosives, drill steel and other process supplies used amounted to \$12,773,650. A total of \$14,733,787 was paid in 1943 by operating Canadian gold mining companies in government taxes and \$723,788 was expended for prospecting.

LODE GOLD DEPOSITS IN CANADA

(By George Hanson, Ph.D., Chief Geologist, Geological Survey, Ottawa)

Lode gold deposits like most metalliferous ore deposits are very closely linked in origin and place with geological formations of certain ages and types. In broad outline these relationships are known and easily understood but because geological information is very incomplete for Canada—less than a fifth of Canada has been studied in any adequate manner—it is not yet possible to indicate the location of more than a part of the ground that is favourable for the occurrence of metallic ore deposits.

Geological explorations extending far beyond ground that has been geologically mapped provide general information and permits the delineation of broad features relating to ore deposition. In mapped areas much more detailed information of like type is available. Knowledge of the relationship between geology and ore deposition is of the greatest importance because it guides the search for new deposits.

Canada is divisible broadly into four large regions, each having its own characteristic stratigraphy and structure. These are from west to east: (1) the Cordilleran region embracing most of British Columbia and Yukon, (2) the Plains region forming a broad belt east of the Cordillera, (3) the Canadian Shield extending east of the St. Lawrence and (4) the Appalachian region embracing southeastern Quebec and the Maritime Provinces.

The Cordilleran Region.—The Cordilleran region comprises all of Canada west of the Plains region. The potential metalliferous part includes practically all of Yukon except the southeastern corner, and all of British Columbia west of the Rocky Mountain trench or west of a line joining Fernie in southeastern British Columbia to Watson Lake in southeastern Yukon.

The rocks of the metalliferous part of the region range in age from Precambrian to Tertiary. All of the strata older than the Tertiary have been folded, faulted, and built into mountains. The structural trends run northwest parallel to the Pacific coast and in Yukon they swing westward into Alaska. The sedimentary and volcanic rocks have been intruded by several very large batholiths and by a great many stocks and small batholiths of granitoid rocks. The Coast Range intrusives occupy much of the western and southern part of British Columbia and the western part of Yukon. The Cassiar and the Omineca batholiths cross the northern interior of British Columbia.

In various places in the region where the geology has been done in some detail it is possible to outline small areas that are favourable for the occurrence of gold deposits and also to point out other small areas that are not favourable. In general, however, present knowledge indicates that practically all of the region that may hold metallic mineral deposits must also be considered as favourable ground for the occurrence of gold, and any rocks older than Upper Cretaceous may hold gold deposits.

In Yukon gold bearing quartz veins have been mined near Whitehorse and on Freegold Mountain in the Carmacks district. Copper deposits near Whitehorse mined some years ago contained some gold. They are of the contact metamorphic type and lie near bodies of intrusive rock.

In British Columbia the principal gold camps are Atlin, Taku, River, Stewart, Surf Inlet, Zeballos, Cariboo, Bridge River, Hedley, and Ymir-Sheep Creek. The chief copper-gold camps are Anyox, Britannia, Copper Mountain, and Rossland. With few exceptions the deposits are all in rocks of Mesozoic age. Most are in rocks that are invaded by the Coast Range intrusives and some are in the intrusives themselves.

At Atlin the gold deposits are of the quartz vein type. Most of the veins are narrow but interbanded with country rock they form vein zones as much as 50 feet wide.

The Principal vein at the Polaris Taku mine on Taku River ranges from 2 to 25 feet wide and is at the contact between greenstone and schists of sedimentary origin.

At Stewart the Premier and adjacent ore bodies lie mainly in quartz-feldspar porphyry and to a minor extent in tuff. The pre bodies were in the main of the gold-sulphide type but some were gold-quartz veins with little sulphide. One of the deposits had a mining width of 70 feet and was of excellent grade. At the Big Missouri broad silicified zones sparsely mineralized with sulphides are cut by narrow veinlets of gold-bearing quartz. In places the veinlets are so numerous that large blocks of ground can be mined.

The Porcher Island-Surf Inlet deposits are gold-quartz veins ranging in width up to 40 feet and occupying fracture zones mainly in granitic rocks of the Coast Range intrusives.

In the Zeballos district, Vancouver Island, numerous gold-quartz veins occur in a body of granite and in adjacent volcanic rocks. The veins are quite persistent in length but many are no more than 1 foot wide.

In the Cariboo district the ores are gold-quartz veins and gold-pyrite replacements in limestone. The veins cut across moderately dipping beds of the Cariboo series of Precambrian age. The ores found so far are restricted to a belt about 1,000 feet wide that has been traced for 20 miles. The gold belt follows certain strata that were fractured during folding and thus provided channelways for ore deposits. Many of the numerous veins carry somewhat more than half an ounce of gold to the ton and the replacements run approximately two ounces.

In the Bridge River district the deposits are gold-quartz veins lying in or near intrusive bodies of diorite. Present information indicates that the best ground is diorite containing a considerable proportion of soda-rich granite. The veins range in width up to 20 feet and are very persistent in length and depth.

In the Hedley district the ores are of the contact metamorphic type containing considerable arsenopyrite. They replace calcareous sedimentary rocks and are roughly tabular in shape. One of the largest ore bodies was 500 feet long and 65 feet thick. The location of the ore has been controlled by the structure of the enclosing rocks and detailed geological study has resulted in the discovery of a great deal of ore.

In the southern Okanagan valley gold-quartz veins in schists of late Palaeozoic age have been mined at Fairview and Camp McKinney and replacement deposits in limestone members of the same series of rocks have been mined at Osyoos.

In the Ymir-Sheep Creek district gold is produced from gold-quartz veins in late Precambrian sedimentary rocks, in Triassic volcanic rocks, and in younger grandiorite intrusives.

Copper ores containing gold have been mined in five districts. At Anyox, large lenses of copper and iron sulphides occurred at the contact between sedimentary rocks and greenstone and in the greenstone. At Britannia large lenses of ore of similar type are mined from a shear zone in sheared porphyry. At copper Mountain extensive deposits occur within a gabbro stock and in adjacent volcanic rocks. In the Greenwood-Grand Forks district deposits of the contact metamorphic type have produced considerable gold and copper. At Rossland the large deposits of copper-gold ore were replacement veins attaining a local width of 130 feet. The best ore was found in the basic intrusive rocks.

The Plains Region.—The Plains region is bounded on the west by the mountains of western Alberta, eastern British Columbia and western Northwest Territories. The eastern boundary is the Canadian Shield and follows closely a line from Darnley Bay on the Arctic coast through Great Bear Lake, Great Slave Lake, Lake Athabaska, Lac la Ronge, Lake Winnipeg and Lake of the Woods. The eastern boundary swings through the northern United States and enters Canada again at Sault Ste. Marie and crosses southern Ontario eastward from Georgian Bay. Much of the western Archipelago and the lowland southwest of Hudson Bay are also of the Plains type. Of similar type also is the lowland along the St. Lawrence between Quebec and Brockville. This part of the Plains region is separated from the Appalachian region on the southeast by a great fault.

The rocks of the Plains region range in age from early Palaeozoic to Tertiary. They are of sedimentary type and are everywhere essentially flat-lying. They have not been cut by intrusive rocks. No deposits of gold quartz nor of gold sulphide types have been found in the region and it is not expected that any will be found. This belief is based not only on the fact that none have been found but also on the sound theory that such ore deposits are related in origin to intrusive rocks and the region does not include rocks of this type. The St. Lawrence lowlands near Montreal are intruded by small stocks of alkaline intrusive rocks. No ore deposits have been found associated with these rocks.

The Canadian Shield.—The Canadian Shield includes some of the Arctic Islands and practically all of the mainland part of Canada east of the Plains region and north of the St. Lawrence River. It consists mainly of intrusive rocks of granite type, including a great many areas of various sizes underlain by greenstones, schists and gneisses derived from volcanic and sedimentary rocks which are older than the granites. The granites and older rocks are mainly of Archaean or Early Precambrian age. The intrusives and included complexes of older rocks are overlain here and there by Proterozoic or Late Precambrian volcanic and sedimentary rocks and are also intruded by Late Precambrian granites.

Present information indicates that the complexes of ancient rocks are the best hosts for ores of the gold-quartz type. Over a hundred mines of this type have been opened and all lie within the complexes. The ores were derived from igneous sources and as igneous rocks exist almost everywhere in the Shield mineral deposits may be much more widespread than is suggested by present mines, and search for new deposits should not be confined to the complexes. However, the location of present mines shows clearly that the complexes are exceptionally favourable for ore deposits.

The gold mines so far discovered in the Shield all lie in the south, southwest and west. The present Quebec and eastern Ontario gold mines lie south of latitude 49°. In western Ontario the mines are within 400 miles of the Plains boundary and farther west the mines are within 200 miles of the Plains boundary. This fringe of mines in the southern and western part of the Shield is probably a result of accessibility rather than any lack of ore farther north.

At Yellowknife, Northwest Territories, gold-quartz veins occur both in the greenstones and in the sedimentary rocks of a large complex. In the sedimentary rocks the veins are numerous along the crests of folds and parallel with the bedding planes. In the greenstone they follow shear zones and are near a great fault extending north along the shore of Yellowknife Bay.

At Goldfields on Lake Athabaska a small complex extends north from the lake. At this place a stockwork of small veinlets was mined for a short time.

North of The Pas, Manitoba, a succession of closely spaced greenstone-sedimentary complexes extend westward into Saskatchewan and for 100 miles east of Flin Flon. In these rocks various gold-quartz veins have been mined as well as the Sherritt Gordon, Flin Flon and Mandy gold-sulphide ores.

Between northwestern Manitoba and Lake Superior several dozen complexes are known and mines have been found in all the more accessible ones. In this area the God's Lake ore is a bed of tuff that has been fractured and mineralized with numerous veinlets of gold-quartz. At the San Antonio, Beresford Lake and Gunnar Gold mines gold-quartz veins lie in diabasic and gabbroic rocks. In the Red Lake district several of the ore deposits occur in quartz porphyry and at the Howey mine the ore body consists of a quartz porphyry dyke that has been fractured and cemented with gold bearing quartz which at the Uchi mine lies at the contact between two basic lava flows. At Pickle Lake the Central Patricia and Pickle Crow ore bodies lie in 'belts' of iron formation. Between Lake of the Woods and Lake Nipigon, many gold-quartz veins have been mined in greenstone near granite contacts. East of Lake Nipigon most of the veins are in greenstone but at Little Long Lac these ores are in silicified shear zones in sedimentary rocks; at the Hardrock and McLeod-Cockshutt mines the ores are in porphyry or at the contact between porphyry and the same series of sedimentary rocks, and at the Bankfield Consolidated and the Tombill the ores are in feldspar porphyry dykes cutting the same series of sedimentary rocks. At Schreiber and at Michipicoten the ore bodies are mainly gold quartz veins in greenstone.

The very large Porcupine complex extending east and northeast far into Quebec and southwest to Lake Huron holds numerous gold-quartz and gold-sulphide deposits and provides roughly 70 per cent of Canada's gold. This complex includes all the mines of the Porcupine, Kirkland Lake, Larder Lake, and Matachewan districts of Ontario and all the mines of northern Quebec. In this complex as elsewhere there is considerable variety in the mode of occurrence of the ores. It has been known for many years that many of the ore bodies from Kirkland Lake eastward were associated with faults and in recent years it has been pointed out that many of the faults are connected to form fault zones. One of these fault zones passes eastward through Kirkland Lake, past Noranda as far at least as Louvicourt Township Quebec.

Many of the gold mines of Ontario and Quebec are located on or near this zone. Another probably traverses the Porcupine district eastward through the Beattie mine in Quebec. A branch fault apparently swings southeast to join the southern fault zone a short distance southeast of the Beattie and another branch appears to run east past Figuery Township.

The Appalachian Region.—The Appalachian region includes all of Canada south of the St. Lawrence and east of a line joining the city of Quebec to Lake Champlain. This region is the northeastern part of the Appalachian Mountain system that extends northeastward from northern Alabama.

In the Appalachian region the geological formations lie in long bands striking northeastward parallel to the mountain chains. They have been severely folded and faulted and have been invaded by bodies of basic rock as in the Eastern Townships and by granites in various places in the Eastern Townships, Gaspé and the Maritime Provinces. The rocks are mainly of Palæozoic age but include younger and older strata. The basic intrusives are mainly of Ordovician age and the granites Devonian.

The source of the gold and gold-copper deposits in the region is generally believed to be the same as that which supplied the bodies of granite. The copper deposits of the Eastern Townships may, however, be related to the basic intrusives and not to the granites. Throughout the region in Canada as well as in the United States the Devonian granites do not appear to have been important as ore carriers and deposits associated with them have not led to large production.

Copper deposits in the Eastern Townships, mined many years ago contained very little gold, but a new find, the Aldermac-Moulton Hill mine contains gold and various sulphides. Recent geological study has shown that many of the copper deposits occurred near a large fault extending northeastward from Lake Memphremagog and this fact has led to a revival of interest which may lead to further discoveries.

Gold production in the region at present comes entirely from southern Nova Scotia from quartz veins in the Gold Bearing or Maguma series of Precambrian age. The deposits are believed to be related to granites of Devonian age that invade the Maguma series. The strata consist of alternating bands of slate and quartzite. These rocks have been folded and quartz veins commonly occur parallel to the bedding in slate at the contacts with bands of quartzite. As the veins are parallel to the bedding they arch with the antiforms and have therefore been referred to as saddle reefs. They are generally narrower than the normal width required for stopes and drifts but at the crests of folds they commonly widen and become many feet thick.

Placer gold in the Chaudière River district in southeastern Quebec was derived presumably from quartz veins in the district. Many of the veins have been tested but none has proved rich enough to mine.

Table 49.—Principal Statistics of the Auriferous Quartz Mining Industry in Canada, for Years Specified

	Number of active operators	(c) Number of operating plants and mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	(b) Cost of process and supplies used	Amount of freight, etc., paid on shipments of ore, slag, etc.	Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines (d)	Net value of bullion, ore, concentrates or residues shipped from mines (d)
			\$		\$	\$	\$	\$	\$	\$	\$
1923.....	65	65	77,574,976	5,524	8,961,434	1,497,197		Data not available		(a) 25,021,837	Data not available
1929.....	80	85	135,166,105	8,060	14,258,733	2,579,481		Data not available		(a) 37,275,986	Data not available
1942—											
Nova Scotia (f).....	6	6	318,438	104	158,602	34,857	37,921	1,782	4,166	370,225	291,499
Quebec.....	50	50	38,379,170	5,736	11,381,876	1,763,649	4,174,550	111,979	540,232	31,413,162	24,822,761
Ontario.....	73	75	175,239,245	16,576	35,079,849	4,833,382	11,143,741	192,431	1,159,252	104,472,446	87,143,640
Manitoba.....	8	8	6,011,285	483	1,060,211	173,162	323,867	6,306	31,933	3,294,248	2,748,980
Saskatchewan.....	3	3	17,100	113	231,088	12,303	170,050	1,785	5,720	533,768	343,910
British Columbia.....	77	78	17,901,610	2,439	5,038,944	549,696	1,524,526	402,705	564,992	16,329,819	13,587,800
Northwest Territories.....	6	7	7,324,149	579	1,418,302	248,717	547,867	24,341	39,978	3,860,275	2,999,372
Yukon.....										840	840
Canada.....	223	227	245,240,997	26,030	54,388,872 (e)	7,615,766	17,925,522	741,329	2,346,264	160,564,783	131,938,902
1943—											
Nova Scotia.....	3	3	102,454	77	100,311	29,955	32,644	740	1,500	181,695	116,847
Quebec.....	41	46	36,743,065	4,730	9,742,932	1,591,293	3,718,472	96,817	493,168	24,088,645	18,188,895
Ontario.....	55	55	153,377,816	12,330	26,726,377	4,108,788	8,005,040	205,794	843,463	79,799,131	66,636,066
Manitoba.....	7	7	4,950,511	283	634,166	127,408	197,163	5,277	26,223	2,400,287	2,044,216
Saskatchewan.....	1	1	9,700				80				154
British Columbia.....	40	40	14,511,081	1,272	2,736,093	381,333	680,405	139,334	231,331	8,094,301	6,861,843
Northwest Territories.....	4	4	2,981,332	346	725,404	149,052	139,846	5,758	25,213	2,269,633	1,949,764
Yukon.....											
Canada.....	151	156	212,675,979	19,038	40,065,383 (e)	6,387,869	12,773,650	453,720	1,620,896	116,833,847	95,597,710

(a) Less freight and treatment charges.

(b) Explosives, chemicals, etc.

(c) Number of mines producing—1923—33; 1929—38; 1937—189; 1938—226; 1939—232; 1940—278; 1941—255; 1942—184; 1943—135.

(d) Value of bullion produced plus value of ore, concentrates, etc. shipped.

(e) Includes \$6,088,392 in salaries in 1943 and \$6,979,330 in 1942.

(f) Does not include data for Queens Mines Ltd.

NOTE.—Net value represents the gross value less the cost of fuel and electricity, process supplies and freight.

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Table 50.—Principal Statistics Relating to Producers Only in the Auriferous Quartz Mining Industry in Canada, 1943

Province	Number of producing plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	(a) Cost of process supplies used	Value of freight paid on shipments of ore, slag, etc.	(b) Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines (d)	Net value of bullion, ore, concentrates or residues shipped from mines (d)
Nova Scotia.....	3	102,454	77	100,311	29,965	32,644	740	1,500	181,696	116,847
Quebec.....	31	35,480,950	4,655	9,593,129	1,580,941	3,709,787	96,817	493,168	24,088,645	18,198,932
Ontario.....	51	153,252,006	12,319	26,717,892	4,108,572	8,005,040	205,794	843,463	79,799,131	66,636,262
Manitoba.....	7	4,980,511	283	634,166	127,408	197,163	5,277	25,223	2,400,287	2,044,216
Saskatchewan.....	1	9,700	.....	.....	.....	80	.....	.....	154	74
British Columbia.....	38	14,339,781	1,253	2,714,106	380,209	677,556	139,334	231,331	8,004,301	6,665,871
Northwest Territories.....	4	2,981,352 (c)	346	725,404	149,052	139,846	5,758	25,213	2,299,633	1,949,764
Yukon.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Canada 1943.....	135	211,116,754	18,933	40,485,008 (e)	6,385,147	12,762,116	453,720	1,620,898	116,833,847	95,611,966
Total Canada 1942.....	184	241,770,115	25,814	54,033,613 (e)	7,570,656	17,880,267	741,329	2,316,261	160,564,788	133,026,267
Total Canada 1941.....	255	231,635,873	31,850	61,063,035	8,336,180	20,721,498	916,323	2,678,508	179,103,182	146,150,673
Total Canada 1940.....	278	230,719,341	30,353	53,560,938	7,935,193	20,390,784	691,649	2,486,587	178,794,078	147,289,865
Total Canada 1939.....	232	214,326,089	29,001	50,891,920	7,701,782	19,001,782	694,165	2,249,312	160,014,172	130,367,887

(a) Explosives, etc.
 (b) Includes handling charges.
 (c) Not recorded separately by one company which includes data in the non-ferrous smelting industry in British Columbia.
 (d) Value of bullion produced plus value of ore, concentrates, etc., shipped.
 (e) Includes \$6,051,901 in salaries in 1943 and \$6,878,890 in 1942.

Table 51.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1943

	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories	Yukon	Canada
Number of producing mines.....	3	31	51	7	1	38	4	.....	135
Ore mined..... ton	9,870	3,761,642	8,238,802	213,684	25	400,363	89,224	.....	12,853,609
Material discarded (sorted)..... ton	.....	133,120	207,018	.....	5	15,360	5,019	.....	301,523
Ore milled..... ton	.....	3,353,194	8,069,363	213,601	20	476,247	84,199	.....	12,206,513
Tailings retreated..... ton	.....	.....	12,750	.....	.....	16,666	.....	.....	29,716
Gold content of ores, slags, residues and concentrates shipped—									
To foreign smelters..... fine oz.	.....	.....	26,371	.....	.....	68,280	.....	.....	94,651
Canadian smelters..... fine oz.	.....	46,917	1,247	.....	.....	2,669	.....	.....	50,833
Bullion bars shipped—									
Gold content..... fine oz.	4,711	579,782	2,032,298	62,192	4	130,549	58,871	.....	2,868,407
Silver content..... fine oz.	157	126,084	329,971	9,887	.....	27,885	13,213	.....	507,197
Bullion produced by amalgamation..... crude oz.	5,052	58,244	237,177	14,800	9	74,364	32,346	.....	431,992
Bullion produced by cyanidation..... crude oz.	.....	719,235	2,315,612	73,186	.....	84,697	36,774	.....	3,229,504
Total Bullion Produced..... crude oz.	5,052	777,479	2,552,789	87,986	9	159,061	69,120	.....	3,651,496
Content of bullion bars produced—									
Gold..... fine oz.	4,711	574,363	2,033,319	62,246	4	136,121	58,871	.....	2,869,635
Silver..... fine oz.	157	125,270	339,611	9,893	.....	30,394	13,213	.....	518,528
Gold value (standard)..... \$	97,483	11,873,137	42,032,341	1,286,739	85	2,814,284	1,214,976	.....	59,319,045
Silver value..... \$	89	56,690	135,774	3,816	.....	11,803	5,099	.....	213,271
Exchange premium on bullion bars produced..... \$	84,124	10,239,839	36,255,405	1,109,732	69	2,389,104	1,049,658	.....	51,127,831
Value of ores, concentrates, slags and residues sold (shipped)..... \$	.....	1,918,979	1,375,611	.....	.....	2,879,110	.....	.....	6,173,700
Total Gross Value of Production..... \$	181,636	24,088,645	79,799,131	2,400,287	154	8,094,301	2,269,633	.....	116,833,847
Value of fuel, electricity and process supplies used, also freight on shipments, marketing, smelter and refining charges..... \$	64,849	5,809,750	13,163,065	356,071	80	1,432,453	319,869	.....	21,236,137
Net Value of Production..... \$	116,847	18,188,895	66,636,066	2,044,216	74	6,661,848	1,949,764	.....	95,597,710

(*) In addition, there were 881,250 ounces of silver contained in concentrates, etc., shipped to smelters. See following table for other details.

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Table 52.—Ores, Concentrates, Slags, Etc., Shipped to Smelters from Canadian Gold Mines, 1929-1943

Year	To Canadian plants				To Foreign plants			
	Ores		Concentrates		Ores		Concentrates	
	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.	Tons	Gold content fine oz.
1929.....	27,278	14,327	268	305	90,871	82,996	2,370	3,638
1930.....	52,540	22,910	1,187	9,665	70,497	22,432	18,276	46,102
1931.....	51,579	21,756	3,120	16,805	24,224	11,870	20,271	48,743
1932.....	36,397	17,943	191	952	36,736	15,810	16,925	52,508
1933.....	30,096	14,882	490	1,349	3,292	2,203	29,111	76,601
1934.....	48,106	29,688	2,490	10,440	1,419	1,936	43,053	114,476
1935.....	18,239	7,008	7,045	35,958	1,242	2,840	46,050	90,167
1936.....	4,705	6,567	7,855	34,654	1,864	3,421	65,680	137,273
1937.....	37,126	9,649	6,981	21,865	2,516	8,108	62,987	163,781
1938.....	172,377	36,008	8,404	25,552	4,445	8,443	40,828	142,513
1939.....	271,666	47,114	7,747	24,184	3,853	8,930	39,530	112,126
1940.....	201,941	34,315	4,485	13,532	7,453	8,107	44,570	125,704
1941.....	202,943	38,380	1,628	7,492	7,453	11,222	43,855	122,619
1942.....	280,978	38,492	2,555	7,307	1,356	1,020	40,428	126,931
1943.....	268,334	36,429	4,490	12,335	.....	.....	20,615	59,949
Grand Total	1,704,305	375,468	58,946	222,395	257,321	189,338	534,529	1,423,131
			2,360	40,760			2,163	278,382

NOTE.—In addition, other material contained in ores shipped by gold mines to Canadian plants in 1943 included: silver, 11,882 fine ounces; copper, 848,742 pounds; lead, 48,123 pounds and crude As₂O₃, 2,581,830 pounds. Tungsten concentrates produced from straight auriferous quartz ores in 1943 contained approximately 257,114 pounds of WO₃.

NOTE.—In addition, other material contained in ore exported by gold mines in 1943 included: silver, 865,368 fine ounces; copper, 175,600 pounds; lead, 3,035,318 pounds and 16,211 pounds crude As₂O₃. Arsenic in auriferous ores exported from British Columbia is not paid for and data relating to its possible recovery are unavailable.

Table 53.—Ores, Concentrates and Slag Shipped from the Auriferous Quartz Mines in Canada, 1943

	Ontario mines shipping		Quebec mines shipping		British Columbia mines shipping	
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters
Number of mines.....	12	3	10	1	29	7
Tons of ore, etc., shipped.....	1,049	2,503	282,054	100	2,784	18,152
Metal content—						
Gold.....oz.	1,247	26,371	46,917		2,669	68,280
Silver.....oz.	5,138	514,885	1,658		5,086	354,483
Copper.....lb.	23,411		825,331			175,603
Lead (a).....lb.		1,135,861			48,123	1,899,457
Antimony (b).....lb.						
Arsenic.....lb.			2,581,830	16,211		(c) 2,772,023
Zinc.....lb.						
Tungsten concentrates*.....lb.	269,038		5,994		14,519	
Cadmium.....lb.						
Value—Gross.....\$	363,989	1,323,376	1,923,121	3,003	113,960	2,784,387

(a) Some B.C. gold ores exported contain relatively large quantities of lead which are not reported by the producer; this lead is reported by the U.S. Smelters and 50 per cent is credited to Canadian lead production.

(b) Any antimony recovered from Canadian ores in Canadian smelters is not usually reported by mine operators.

(*) WO₃ content; value included also in miscellaneous metal mining industries.

(c) Estimate and arsenic not paid for.

Table 54.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1943

Name of Mine	Develop- ment and exploration (a)	Mining	Milling	General (b)	Total cost per ton (c)
	\$	\$	\$	\$	\$
QUEBEC					
Beattie Gold Mines Ltd.....	0-243	0-725	1-085	0-462	2-515
Belletierre Quebec Mines Ltd.....	1-363	4-158	1-255	2-030	8-806
Canadian Malartic Gold Mines Ltd.....	0-57	1-27	0-61	0-35	2-83
Central Cadillac Mines Ltd.....	0-78	3-46	1-39	1-01	6-64
Francoeur Gold Mines Ltd.....	0-155	2-012	1-514	1-089	4-770
Lamaque Mining Co. Ltd.....	0-71	2-39	0-86	2-61	6-57
Lapa Cadillac Gold Mines Ltd.....	0-79	2-96	1-63	1-23	6-66
McWaters Gold Mines Ltd.....	1-196	2-024	1-405	1-039	9-28
O'Brien Gold Mines Ltd.....	0-72	4-77	1-69	2-10	5-664
Powell Rouyn Gold Mines Ltd.....	0-396	1-946	(d)	0-529	2-871
Senator Rouyn Ltd.....	0-78	1-77	1-04	1-37	4-96
Sigma Mines (Quebec) Ltd.....	0-705	2-241	0-631	0-349	3-925
Siscoe Gold Mines Ltd.....	0-293	1-575	0-699	0-577	3-144
Sladen Malartic Mines Ltd.....	0-429	1-631	0-756	0-406	3-222
West Malartic Mines Ltd.....	0-614	2-411	0-925	0-512	4-462
MANITOBA					
God's Lake Gold Mines Ltd.....	0-18	1-89	1-52	1-69	5-28
BRITISH COLUMBIA					
Bralorne Mines Ltd. (e).....	0-91	3-46	0-83	2-10	7-30
Cariboo Gold Quartz Mining Co. Ltd.....	0-44	10-28	3-34	1-38	16-44
Gold Belt Mining Co. Ltd. (e).....	0-131	1-603	1-746	0-606	4-086
Hedley Mascot Gold Mines Ltd. (e).....	1-16	2-70	2-15	3-25	9-26
Island Mountain Mines Co. Ltd.....	0-65	7-02	3-74	0-40	11-81
Kootenay Belle Gold Mines Ltd.....		2-94	2-34	2-00	7-28
Livingstone Mining Co. Ltd. (d).....		6-00		1-50	7-50
Privateer Mine Ltd.....	1-05	6-35	4-96	2-89	15-25
Pioneer Gold Mines of B.C. Ltd.....	0-83	6-79	2-72	3-48	13-82
Sheep Creek Gold Mines Ltd.....	0-133	3-733	1-908	1-398	7-172

(a) Exclusive of outside exploration.

(b) Marketing, head office, taxes, etc.

(c) Depreciation not included.

(d) Ore shipped to smelter.

(e) Produced bullion and shipped concentrates to smelter.

Table 55.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Ontario, 1943

Name of Mine	Develop- ment and explora- tion (a)	Mining	Milling	General (b)	Total before taxes	Total including taxes
ONTARIO	\$	\$	\$	\$	\$	\$
Porcupine District						
Aunor Gold Mines Ltd.....	0.72	3.14	0.98	1.09	5.88	8.41 (d)
Bonetal Gold Mines Ltd.....	0.61	2.80	1.34	0.77	5.52	5.52
Broulan Porcupine Mines Ltd.....	0.35	2.27	0.84	0.94	4.40	5.34
Buffalo Ankerite Gold Mines Ltd.....	0.80	3.22	0.76	1.06	5.84	7.20 (e)
Coniaurum Mines Ltd.....	1.81	3.90	1.04	0.45	7.20	8.27
Dome Mines Ltd.....	0.642	1.696	0.973	0.777	4.088	6.370
Hollinger Cons. Gold Mines Ltd. (Hollinger).....	1.0669	3.2463	0.7405	1.0099	6.0636	7.2636
Hollinger Cons. Gold Mines Ltd. (Ross).....	0.4884	1.5687	1.8931	0.5431	4.4933	4.8678
Hoyle Gold Mines Ltd.....	0.32	1.59	0.95	0.93	3.79	(f)
McIntyre Porcupine Mines Ltd.....	0.706	3.911	0.952	0.290	5.859	7.740
Moneta Porcupine Mines Ltd.....	0.794	4.110	2.012	0.881	7.797	9.756
Pamour Porcupine Mines Ltd.....	0.23	0.82	0.58	0.29	1.92	2.37
Paymaster Cons. Mines Ltd.....	0.66	3.66	1.56	0.56	6.44	(f)
Preston East Dome Mines Ltd.....	1.19	3.41	0.81	0.33	5.74	6.34
Kirkland Lake District						
Bidgood Kirkland Gold Mines Ltd.....	1.57	4.16	1.50	1.10	8.33	8.86
Kirkland Lake Gold Mining Co. Ltd.....		6.933	1.462	1.275	9.67	10.71
Macassa Mines Ltd.....	0.93	3.84	1.33	1.19	7.29	9.70
Teck-Hughes Gold Mines Ltd.....	(g)	3.69	1.28	1.32	6.29	8.16
Upper Canada Mines Ltd.....	1.83	4.30	1.24	1.40	8.77	12.77
Wright Hargreaves Mines Ltd.....	(g)	4.948	1.341	1.577	7.866	11.395
Larder Lake District						
Chesterville Larder Lake Gold Mining Co. Ltd.....	0.67	1.72	0.99	0.51	3.89	3.89
Kerr Addison Gold Mines Ltd.....		1.424	0.647	0.358	2.429	3.668
Omega Gold Mines Ltd.....	0.888	2.808	1.446	0.087	5.229	(f)
Matatchewan and Sudbury Districts						
Hollinger Cons. Gold Mines Ltd. (Young-Davidson).....	0.0319	1.3325	0.7985	0.4244	2.5873	3.0309
Jerome Gold Mines Ltd.....	0.051	1.993	0.843	0.649	3.536	3.550
Matatchewan Cons. Mines Ltd.....	0.280	0.999	0.714	0.384	2.377	(f)
Thunder Bay and Kenora Districts						
Leitch Gold Mines Ltd.....	1.35	8.58	2.77	2.26	14.96	18.75
Little Long Lac Gold Mines Ltd.....	1.52	3.62	2.17	1.70	9.01	9.45
MacLeod-Cockshutt Gold Mines Ltd.....	0.7539	2.0990	1.2968	1.1415	5.2912	7.7010
Patricia District						
Central Patricia Gold Mines Ltd.....	1.22	2.79	1.25	1.43	6.69	9.48
Cochenour Willans Gold Mines Ltd.....	1.722	3.190	1.859	2.871	9.645	11.349
Hasaga Gold Mines Ltd.....	0.1890	1.5780	1.1499	0.3761	3.2930	(f)
Madsen Red Lake Gold Mines Ltd.....	0.492	1.844	0.991	0.931	4.258	5.576
McKenzie Red Lake Gold Mines Ltd.....	0.5808	3.3774	1.1754	1.2695	6.4032	7.7362
Pickle Crow Gold Mines Ltd.....	1.45	4.38	1.34	1.58	8.75	(f)
Uchi Gold Mines Ltd.....	0.433	2.190	1.169	3.846	7.638	7.638

(a) Exclusive of outside exploration.

(b) Marketing, head office, etc. (exclusive of taxes).

(c) Depreciation not included.

(d) Includes depreciation and deferred development write off.

(e) Includes depreciation.

(f) Not recorded.

(g) Included with mining.

Table 56.—Dividends Paid and Ore Reserves of Specified Canadian Gold Mining Companies

Name of Firm	Dividends Paid		Estimated Ore Reserve (*)	
	During 1943	Total to Dec. 31, 1943	Total	Average ounces or dwts. fine gold or \$ per ton
QUEBEC	\$	•\$	tons	
Arntfield Gold Mines Ltd.			(a)	(a)
Beattie Gold Mines Ltd.	200,000	4,194,890	(b)	3,740,450 (a) 0.131 oz.
Belelterre Quebec Mines Ltd.			(a)	
Canadian Malartic Gold Mines Ltd.	146,054	1,860,966	(d)	1,700,000 (a) 0.124 oz.
Central Cadillac Mines Ltd.	(a)		(a)	
East Malartic Mines Ltd.		2,200,000	(b) (c)	2,682,000 (k) \$7.56
Francoeur Gold Mines Ltd.		208,884	(b) (c)	329,000 (a) 0.25 oz.
Golden Manitou Mines Ltd. (m)			(j)	516,500 (a) 0.085 oz.
Lamaque Mining Co. Ltd.	1,364,965	8,201,872	(d) (c)	2,083,533 (l) 4.36 dwts.
Malartic Gold Fields Ltd.		400,000	(b) (c)	708,885 (1) \$7.70
McWatters Gold Mines Ltd.		653,577	(a)	
Mic-Mac Mines Ltd.			(a)	
O'Brien Gold Mines Ltd.	97,500	1,332,500	(f)	229,752 (a) 0.359 oz.
Perron Gold Mines Ltd.	200,000	1,940,000	(b)	306,404 (a) 0.202 oz.
Powell Rouyn Gold Mines Ltd.	50,000	262,500	(b)	583,853 (a) 0.126 oz.
Senator Rouyn Limited.	102,250	102,250	(d) (c)	213,588 (a) 0.186 oz.
Sigma Mines (Quebec) Limited.	600,000	1,980,000	(b)	1,311,900 (h) 0.203 oz.
Siscoe Gold Mines Ltd.	278,404	8,024,001	(d)	589,372 (a) \$4.24
Sladen Malartic Mines Ltd.			(b) (c)	475,000 (k) \$3.70
Stadacona Rouyn Mines Ltd.			(a)	
Sullivan Consolidated Mines Ltd.	320,000	2,040,000	(i) (c)	622,000 (l) \$10.36

(a) Data not available at present.

(b) January 1, 1943.

(c) Partial only.

(d) January 1, 1944.

(e) Positive ore.

(f) October 1, 1943.

(g) March 31, 1943.

(h) Average 1941.

(i) February 15, 1943.

(j) May 1943 also contains 9.5 per cent zinc and 4.50 ounces silver per ton.

(k) \$35.00 gold.

(l) \$38.50 gold.

(m) Classified as a silver-lead-zinc mine.

ONTARIO				
Porcupine District				
Aunor Gold Mines Ltd.	360,000	1,000,000	(a)	(a)
Bonetal Gold Mines Ltd.			(a)	
Broulan Porcupine Mines Ltd.	242,460	808,202	(b)	605,700 (a) 0.207 oz.
Buffalo Ankerite Gold Mines Ltd.	70,168	2,622,673	(c) (d)	325,341 (1) \$7.709
Coniarnum Mines Ltd.	276,674	2,785,072	(b) (e)	88,673 (a) 0.2925 oz.
Delnite Mines Ltd.	89,363	625,541	(b) (e)	93,357 (a) 0.197 oz.
Dome Mines Ltd.	3,114,669	55,621,871	(d)	2,426,000 (a)
Hallnor Mines Ltd.	700,000	5,100,000	(b)	630,886 (a) 0.37 oz.
Hollinger Cons. Gold Mines Ltd. (Timmins)	3,198,000	116,286,400	(d)	7,735,904 (a) 0.331 oz.
Hollinger Cons. Gold Mines Ltd. (Ross)			(d)	679,059 (a) 0.230 oz.
Hoyle Gold Mines Ltd.			(f)	1,277,600 (a) 0.106 oz.
McIntyre Porcupine Mines Ltd.	2,657,340	32,475,068	(g)	4,435,161 (a) 0.3174 oz.
Moneta Porcupine Mines Ltd.	152,631	1,297,368		
Pamour Porcupine Mines Ltd.	250,000	3,050,000	(d)	1,608,000 (a) 0.110 oz.
Paymaster Cons. Mines Ltd.	86,290	517,745	(h)	576,705 (a) 0.235 oz.
Preston East Dome Mines Ltd.	600,000	2,700,000	(d)	820,820 (a) 0.227 oz.
Kirkland Lake District (†)				
Bidgood Kirkland Gold Mines Ltd.			(b)	70,137 (a) \$12.13
Kirkland Lake Gold Mining Co. Ltd.	213,067	3,933,875	(d)	356,538 (m) \$13.62
Lake Shore Mines Ltd.	1,600,000	90,820,000	(a)	
Macassa Mines Ltd.	642,736	6,326,131	(d)	492,600 (n) \$17.36
Sylvanite Gold Mines Ltd.	395,940	8,664,410	(d) (e)	71,015 (a)
Teck-Hughes Gold Mines Ltd.	1,442,143	38,527,366	(d)	304,010 (a) 6.72 dwts.
Toburn Gold Mines Ltd.	74,000	2,183,000	(b)	93,400 (a) 0.53 oz.
Upper Canada Mines Ltd.	296,302	1,200,019	(a)	
Wright-Hargreaves Mines Ltd.	1,925,000	41,027,500	(j)	1,185,445 (a) 0.50 oz.
Larder Lake District				
The Chesterville Larder Lake Gold Mining Co. Ltd.	52,067	442,568	(b)	583,400 (a) 0.140 oz.
Kerr-Addison Gold Mines Ltd.	1,655,605	5,676,361	(d) (c)	8,244,236 (a) 0.2002 oz.
Omega Gold Mines Ltd.			(g)	400,000 (a) 0.153 oz.
Yama Gold Mines Ltd.			(a)	
Matachewan District				
Hollinger Cons. Gold Mines Ltd. (Young-Davidson)	63,364	253,457	(d) (e)	1,165,759 (a)
Matachewan Consolidated Mines Ltd.		68,600	(b)	1,237,858 (a) 0.108 oz.
Sudbury District				
Jerome Gold Mines Ltd.			(m)	213,442 (a) 0.166 oz.

Table 56.—Dividends Paid and Ore Reserves of Specified Canadian Gold Mining Companies—Continued

Name of Firm	Dividends Paid		Estimated Ore Reserve (*)	
	During 1943	Total to Dec. 31, 1943	Total	Average ounces or dwts. fine gold or \$ per ton
	\$	\$	tons	
Thunder Bay District				
Hard Rock Gold Mines Ltd.....	89,702	926,923	(b) (c) 410,000	(a) \$ 7.46
Leitch Gold Mines Ltd.....	256,500	1,225,502	(d) 210,160	(a) \$29.43
Little Long Lac Gold Mines Ltd.....	73,640	3,700,815	(d) 436,566	0.354
McLeod-Cockshutt Gold Mines Ltd.....	143,124	1,281,020	(k) 776,030	0.229 oz.
Magnet Cons. Mines Ltd.....	90,000	855,000	(b) 69,000	(a)
Patricia District				
Berens River Mines Ltd.....	120,000	420,000	(b) 124,700	0.35 oz.
Cochenour Willans Gold Mines Ltd.....	266,549	798,147	(a)	(a)
Central Patricia Gold Mines Ltd.....	300,000	3,375,000	(d) 445,269	0.38 oz.
Hasaga Gold Mines Ltd.....			(b) (c) 466,816	0.1411 oz.
Jason Mines Ltd.....		119,960	(b) 45,888	(n) \$16.13
Madsen Red Lake Gold Mines Ltd.....	209,972	733,701	(l) (c) 807,270	0.201 oz.
McMarnac Red Lake Gold Mines Ltd.....	82,000	82,900	(a)	(a)
McKenzie Red Lake Gold Mines Ltd.....	322,850	2,599,400	(a)	(a)
Pickle Crow Gold Mines Ltd.....	300,000	7,650,000	(d) 642,665	\$13.48

(a) Complete data not yet available.

(b) January 1, 1943.

(c) Partial only.

(d) January 1, 1944.

(e) Broken ore.

(f) July 31, 1942.

(g) March 31, 1944.

(h) June 30, 1943.

(i) Several years reported.

(j) August 31, 1942.

(k) September 30, 1943.

(l) February, 1943.

(m) August 31, after making allowance for 10 per cent dilution.

(n) \$38.50 gold.

(o) \$35.00 gold.

MANITOBA				
God's Lake Gold Mines Ltd.....		262,500		
San Antonio Gold Mines Ltd.....	478,602	3,795,904	(b) 920,908	(a)

(a) Not available.

(b) January 1, 1943.

BRITISH COLUMBIA				
Bayonne Cons. Mines Ltd.....		25,000	(a)	(a)
Brulorne Mines Ltd.....	1,496,400	11,462,150	(c) 1,085,000	0.508 oz.
Cariboo Gold Quartz Mining Co. Ltd.....	53,332	1,679,976	(b) 423,311	0.398 oz.
Gold Belt Mining Co. Ltd.....		255,000	(d) 11,680	0.335 oz.
Hedley Mascot Gold Mines Ltd.....	135,848	1,290,553	(b) 190,000	(a)
Island Mountain Mines Co. Ltd.....	78,804	982,409	(a)	(a)
Kootenay Belle Gold Mines Ltd.....		357,856		
Kelowna Exploration Co. Ltd.....	90,000	1,200,000	(a)	
Musketeer Mines Ltd.....		165,000	(d) 23,000	0.40 oz.
Mount Zeballos Gold Mines Ltd.....		1,865,101	(b) 4,994	0.768 oz.
Privateer Mine Ltd.—Privateer	171,786		(b) 26,161	0.428 oz.
Prident			(c) 213,842	0.433 oz.
Pioneer Gold Mines Ltd.....		9,299,392	(d) 181,758	(a)
Polaris Taku Mining Co. Ltd.....			(e) 132,558	0.388 oz.
Sheep Creek Gold Mines Ltd.....	262,500	2,137,500	(e) 149,269	0.24 oz.
Surf Inlet Cons. Gold Mines Ltd.....		120,278	(a)	0.136 oz.
Silbak Premier Mines Ltd.....	325,000	2,125,000	(b) 125,000	(a)
Spud Valley Mines Ltd.....		168,000	(f)	(a)
Vancouver Island Drilling & Exploration Co. Ltd.....			(a)	(a)
White Star Mine Ltd.....		3,080	(a)	(a)

(a) Complete data not yet available or reported.

(b) January 1, 1943.

(c) January 1, 1944.

(d) March, 1943.

(e) May, 1942.

(f) July, 1942.

NORTHWEST TERRITORIES				
Negus Mines Ltd.....	99,850	349,475	(*) 27,500	0.82 oz.
Thompson Lundmark Gold Mines Ltd.....			(*) 57,894	0.44 oz.

(*) January 1, 1943.

(a) Subject to revision and based on information secured from companies' annual printed reports.

It should be noted that annual estimates of ore reserves are more or less based on current development and exploration to date, and that eventual or actual ore reserves of most mines are very much in excess of those recorded in this report.

Table 57.—Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1928-1943 (Averages)

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter refinery treatment of ores and bullion shipped per ounce of gold produced	Taxes per ounce of gold produced	Total of specified costs
	ounces	\$	\$	\$	\$	\$	\$
1928.....	206	1.47	7.45	Information not available 1928 to 1934	Information not available 1928 to 1936	Information not available 1928 to 1943	.....
1929.....	218	1.46	7.18				.....
1930.....	237	1.25	6.63				.....
1931 (a).....	250	1.19	6.50				.....
1932.....	255	1.21	6.31				.....
1933 (b).....	207	1.36	7.45				.....
1934 (c).....	154	1.71	9.64				.....
1935.....	146	1.89	10.48	4.38			16.75
1936.....	137	1.96	11.32	4.46			17.76
1937.....	132	2.10	12.18	4.65	0.33 (d)		19.26
1938.....	150	1.85	10.95	4.53	0.56		17.89
1939.....	157	1.81	10.69	4.45	0.67		17.62
1940.....	161	1.76	10.48	4.49	0.69		17.42
1941.....	155	1.82	11.56	4.53	0.77		18.68
1942.....	176	1.84	11.47	4.34	0.75		18.40
1943.....	176.7	2.12	11.47	4.24	0.69	4.89	23.41

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25.8 to 15 5/21 grains, 0.9 fine.

(d) Not including Mint charges and marketing prior to 1938.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as entirely reflecting "Cause and effect" in the operation of producing mines **only** but rather as indices of change in the industry as a whole. For data relating to producers only, see Table 40.

Table 58.—Certain Data (Averages) Relating to the Total Production of Gold by Producers Only in the Auriferous Quartz Mining Industry in Canada, 1931, 1939-1945

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter refinery treatment of ores and bullion shipped per ounce of gold produced	Taxes per ounce of gold produced	Total of specified costs
	ounces	\$	\$	\$	\$	\$	\$
1931.....	256	1.19	6.38	(x)	(x)	(x)	.....
1939.....	164	1.76	10.25	4.33	0.67	(x)	17.01
1940.....	165	1.72	10.20	4.41	0.69	(x)	17.02
1941.....	158	1.79	11.37	4.46	0.77	(x)	18.39
1942.....	177	1.83	11.41	4.33	0.75	(x)	18.32
1943.....	177.6	2.12	11.42	4.23	0.69	4.89	23.35

(x) Data not available.

Table 59.—Principal Statistics Relative to All Ontario Gold Mines by Areas (x), 1941-1943

Camp or district	Number of producers	Ore (†) treated	Total gold recovered	Average ounces per ton recovered	Employees	Salaries and wages paid	Cost of fuel, electricity and process supplies
1941	No.	Tons	Fine oz.		No.	\$	\$
Porcupine.....	21	5,974,447	1,439,148	·24	9,746	19,230,445	8,110,392
Kirkland Lake.....	12 (b)	1,900,481	743,123	·39	4,359	8,253,004	3,836,956
Larder Lake.....	4	1,124,221	205,766	·18	1,135	2,347,675	1,218,731
Matachewan.....	2	543,677	58,683	·11	521	999,239	662,812
Sudbury.....	4	148,119	23,420	·15	468	913,103	324,611
Algoma.....	3	89,432	11,565	·13	166	291,953	143,423
Thunder Bay.....	16 (a)	823,954	243,321	·29	1,883	3,611,904	1,930,980
Rainy River and Kenora.....	7	53,459	18,162	·34	231	381,904	157,196
Patricia.....	13	1,569,616	372,727	·24	2,490	4,799,957	2,797,612
Eastern Ontario.....	1	300	60	·20	8	5,052	3,400
Total.....	83	12,227,706	3,115,975	·25	21,007	40,834,236	19,186,113
1942							
Porcupine.....	20	5,624,554	1,308,291	·23	8,499	18,209,637	7,501,441
Kirkland Lake.....	10 (b)	1,309,361	543,284	·41	2,946	6,028,485	2,812,489
Larder Lake.....	4	1,166,209	214,751	·18	1,057	2,119,060	1,033,205
Matachewan.....	2	611,982	59,085	·10	392	810,796	621,333
Sudbury.....	2	200,011	33,414	·17	339	687,691	269,285
Algoma.....	3	52,125	8,804	·16	98	197,350	94,898
Thunder Bay.....	10	662,816	218,430	·24	1,366	3,061,671	1,790,286
Rainy River and Kenora.....	5	36,449	12,039	·25	125	243,690	93,348
Patricia.....	11	987,697	294,103	·23	1,754	3,721,469	1,760,838
Eastern Ontario.....							
Total.....	67	10,651,204	2,692,201	·24	16,576	35,079,849	15,977,123
1943							
Porcupine.....	17	4,297,973	1,020,973	·24	6,519	14,115,867	5,581,209
Kirkland Lake.....	9 (b)	1,114,818	466,052	·42	2,514	5,429,511	2,435,094
Larder Lake.....	4	981,020	169,281	·17	730	1,561,707	995,761
Matachewan.....	2	442,506	38,722	·09	279	569,835	465,629
Sudbury.....	1	107,608	18,641	·17	119	289,018	126,721
Algoma.....	1	1,782	254	·14	10	14,965	5,566
Thunder Bay.....	5 (a)	438,522	141,504	·32	919	2,011,819	1,145,151
Rainy River and Kenora.....	3	3,420	1,546	·45	13	26,111	10,255
Patricia.....	9	681,714	203,964	·30	1,227	2,707,544	1,348,422
Eastern Ontario.....							
Total.....	51	8,069,363	2,060,937	·25	12,330	26,726,377	12,113,808

(a) In addition, 588 tons tailings were treated in 1941 and 5,887 tons in 1943.

(b) In addition, 407,823 tons tailings were retreated in 1941; 5,176 tons in 1942, and 6,863 tons in 1943.

(x) Includes data for all active properties.

(†) Does not include low-grade discarded by sorting, but includes ore milled or smelted.

Table 60.—Milling Capacity of Producing Canadian Gold Mines, 1935-1943
(Tons of 2,000 pounds per 24 hours)

Year	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories
1935.....	292	3,368	20,921	1,465	.....	2,960	.....
1936.....	713	4,514	22,639	1,000	.....	4,120	.....
1937.....	565	6,090	25,249	975	30	3,915	.....
1938.....	542	8,217	30,097	875	1,000	4,590	.....
1939.....	562	9,580	33,324	865	1,000	4,417	.....
1940.....	450	11,215	35,030	690	1,200	4,255	275
1941.....	319	12,654	37,416	990	1,355	4,510	510
1942.....	247	14,330	36,135	903	1,202	4,303	710
1943.....	280	13,304	32,555	753	2	2,845	510

Table 61.—Ores Mined and Treated by Auriferous Quartz Mining Industry, for Years Specified

Year	Ore hoisted	Ore milled (c)	Crude ore shipped to smelters (d)	Low grade sorted out	Tailings retreated	Gold recovered as bullion (b)	Gold in crude ore shipped	Gold in concentrates, slag, etc., shipped
	tons	tons	tons	tons	tons	fine oz.	fine oz.	fine oz.
1925.....	3,646,460	3,527,021	118,436 †	(a)	48,475	1,482,294	97,011	34,131
1930.....	4,472,803	4,306,869	123,037	(a)	37,095	1,782,556	45,342	56,893
1935.....	8,832,901	8,888,129	19,481	(a)	57,798	2,492,145	9,848	143,060
1936.....	10,694,208	10,504,181	6,569	(a)	33,814	2,903,063	9,988	192,439
1937.....	12,388,489	11,880,323	39,642	457,622	97,710	3,283,795	17,757	188,618
1938.....	14,749,649	14,158,555	176,822	528,696	64,926	3,810,642	44,451	191,586
1939.....	17,105,744	16,150,173	275,519	660,578	18,426	4,160,352	56,044	167,448
1940.....	18,986,306	18,083,439	209,394	757,538	180,311	4,386,673	42,422	190,157
1941.....	20,031,736	19,026,273	210,396	936,003	480,289	4,405,986	49,602	(c) 190,738
1942.....	17,722,866	16,820,442	282,334	658,439	5,176	3,898,999	39,512	(e) 198,068
1943.....	12,853,610	12,206,518	268,334	361,522	29,716	2,869,635	36,429	109,055

(a) Not available.

(b) Content of bullion shipped 1925-1935; 1936-1943 content of bullion produced.

(c) + (d) = total crude ore treated (not including sorted material).

(e) Gold in material shipped by gold mines to other gold mines for treatment is included under bullion.

(†) In addition, a relatively small tonnage of unclassified ores was shipped.

Table 62.—Gold Content of Bullion Produced and of ores, concentrates, etc., Shipped, Average Grade of Ore and Ore Milled at Auriferous Quartz Mines in Canada, With Average Price of Gold in Canadian Funds, 1929-1943

Year	Tonnage treated (*)	Gold content fine oz. (b)	Oz. of fine gold per ton	Average price of gold
1929.....	4,371,143	1,771,526	.41	20.67
1930.....	4,429,906	1,884,791	.43	20.67
1931.....	5,526,379	2,271,278	.41	21.55
1932.....	5,997,492	2,502,327	.42	23.47
1933.....	6,480,184	2,455,365	.38	28.60
1934.....	7,524,803	2,490,513	.33	34.50
1935.....	8,907,610	2,645,659	.30	35.19
1936.....	10,510,750	3,095,427	.29	35.03
1937.....	11,919,965(a)	3,490,170	.29	34.99
1938.....	14,335,377(a)	4,046,679	.28	35.17
1939.....	16,425,692(a)	4,383,844	.27	36.14
1940.....	18,292,833(a)	4,619,252	.25	38.50
1941.....	19,236,669(a)	4,646,326	.24	38.50
1942.....	17,102,776(a)	4,131,579	.24	38.50
1943.....	12,474,852(a)	3,015,119	.24	38.50

(*) Does not include tailings retreated, but includes ore milled plus crude ore shipped to smelters.

(a) Material discarded by sorting not included.

(b) Relatively small quantity of gold contained in concentrates, slags, etc. shipped and in cyanide solution in circuit may have originated in ores treated during the previous year; from 1937 represents metal content of total bullion produced plus metal in ores or concentrates shipped to smelters.

Table 63.—Specified Taxes Paid by Active Canadian Auriferous Quartz Mines in 1943, by Provinces (x)

Nature of Tax	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	North-west Territories	Canada
	\$	\$	\$	\$	\$	\$	\$	\$
Dominion Income Tax, including tax on non-operating revenue.....		642,554	3,801,912	103,599		465,639	8,910	5,022,614
Dominion Excess Profits Tax.....		1,073,708	5,871,066	(a) 187,724		622,626	41,979	7,797,163
Provincial taxes.....	374	372,287	940,066	801		156,937	13,977	1,484,442
Municipal taxes.....	616	123,423	283,473			9,127	(b) 12,929	429,568
Total all specified taxes...	990	2,212,032	10,896,517	292,124		1,254,329	77,795	14,733,787

(x) Does not include complete data relating to taxes that may have been paid by dormant firms.

(a) Includes \$30,832 U.S.A. income taxes.

(b) Includes \$4,489 other taxes.

Table 64.—Certain Specified Expenditures Made by Auriferous Quartz Mining Companies, 1942 and 1943

Province and year	Workmen's compensation	Silicosis assessment	Unemployment insurance	Aggregate cost of all supplies purchased	Aggregate cost of plant and equipment purchased
	\$	\$	\$	\$	\$
Nova Scotia— 1942.....	4,413		958	13,624	5,400
1943.....	5,032		1,000	28,508	6,000
Quebec..... 1942.....	356,993	3,733	70,804	6,156,189	1,294,283
1943.....	276,270	3,864	65,393	4,985,946	392,997
Ontario— 1942.....	852,379	746,827	227,966	16,490,839	1,907,407
1943.....	679,519	562,053	194,002	12,687,037	532,737
Manitoba— 1942.....	29,554	7,003	4,988	459,890	34,674
1943.....	20,561	4,920	3,264	263,082	18,646
Saskatchewan 1942.....	(x)	(x)	(x)	(x)	(x)
1943.....					
British Columbia— 1942.....	138,086	139,043	22,748	1,863,036	83,257
1943.....	104,921	104,816	18,092	1,112,819	28,307
Northwest Territories— 1942.....	17,485		3,788	1,034,559	118,045
1943.....	17,206		2,575	451,798	573,969
Total Canada —1942.....	1,398,910	896,606	331,252	26,018,137	3,443,066
1943.....	1,103,509	675,653	284,326	19,529,190	1,552,656

(x) Data not available.

Table 65.—Cost of Prospecting Conducted During 1943 by Canadian Auriferous Quartz Mining Companies

Province prospecting was conducted in—	By Quebec companies (x)	By Ontario companies (x)	By Manitoba companies (x)	By British Columbia companies	By Northwest Territories companies	Total
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	1,987					1,987
New Brunswick.....	877					877
Quebec.....	67,905	15,601				83,506
Ontario.....	22,898	188,001	5,901	12,401		229,201
Manitoba.....	1,829	26,402	106,605	10,515		145,351
Saskatchewan.....	4,633					4,633
British Columbia.....	17	57,489		180,488		237,994
Northwest Territories.....	70				5,130	5,200
Yukon.....		4,032		11,007		15,039
Total Canada.....	100,216	291,525	112,506	214,411	5,130	723,788

(x) Province in which the companies' principal operations are conducted.

Near the end of 1943 the Mines and Geology Branch, Department of Mines and Resources, Ottawa, completed arrangements whereby prospectors would receive special consideration under the wartime employment and food rationing regulations as required to enable them to organize and maintain prospecting parties in the field in 1943. Under these arrangements, employment and selective service offices and local ration boards will accord this special consideration to bona fide prospectors, certified as such by the possession of prospectors' identification cards issued through the Branch, mainly by the provincial mining recorders.

Table 66.—Drilling Completed on Auriferous Quartz Deposits in 1945 (x)

	Footage drilled
Diamond drilling for exploration (testing)—	
By companies with their own equipment and personnel.....	543,062
By contractors.....	1,321,727
Other drilling—	
Diamond drilling for breaking rock or ore:	
By companies with their own equipment and personnel.....	97,298
By contractors.....	591,558
Drilling by percussion and other machines.....	120,014,708

(x) This is not complete as no records are kept by some companies.

(†) Subject to revision.

THE COPPER-GOLD-SILVER MINING INDUSTRY, 1943

The mining of "copper-gold-silver" ores in Canada during 1943 was confined to the province of Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario; important quantities of gold and silver are also being extracted from these copper-nickel ores. General statistics relating to labour, etc., in the nickel-copper industry are not included in this report.

Mining operations conducted on Canadian copper-gold-silver deposits (sulphide) during 1943 were reported by 20 firms compared with 26 in 1942 and 21 in 1941. The gross value of crude ore, concentrates, etc., shipped in 1943 from the mines and mills to smelters was estimated at \$73,536,322; the cost of fuel, purchased electricity, process supplies, freight and smelter treatment totalled \$29,695,643 and the net value of shipments was computed at \$43,840,679. Employees in 1943 totalled 5,748 compared with 5,646 in the preceding year.

The gross value of ores shipped by firms which both mine and smelt their own ores is sometimes not reported. This necessitates considerable estimating in determining gross and net values for mine shipments. However, possible abnormal evaluations resulting from this are largely compensated for in determining the value added at the smelters and refineries. This added value is credited to the non-ferrous smelting and refining industry and is also included in the total net value of production of the entire Canadian mining industry. This fact should be noted in making any statistical study of the annual production values shown for shipments from copper-gold-silver mines.

The statistics as herein shown under the copper-gold-silver mining industry refer only to mines and mills and are not inclusive of data pertaining to the operation of smelters and refineries. Statistics relating to the reduction of non-ferrous ores are recorded under the non-ferrous smelting and refining industry.

Quebec.—Noranda Mines Ltd.: A total of 9,874 feet of drifting, 908 feet of raising and 61,588 feet of exploratory diamond drilling was done in 1943. Due to a shortage of labour which prevailed throughout the year, underground exploration was greatly reduced and slow progress was made in exploring the deeper levels of the mine. From information obtained in diamond drilling and other openings in the various ore-bodies, there is now indicated above the 2,975 foot level, as of January 1, 1944, the following tonnages of ore: Sulphide ore over 4 per cent copper, 5,174,000 tons containing 7.03 per cent copper and 0.157 ounces gold per ton; sulphide ore under 4 per cent copper, 17,460,000 tons containing 0.90 per cent copper and 0.186 ounces gold per ton and 768,500 tons of silicious fluxing ore containing 0.11 per cent copper and 0.083 ounces gold per ton. During 1943 the smelter treated 1,380,738 tons of ore, concentrate and slag, including 428,073 tons of custom ores and concentrates, and produced 137,466,885 pounds of anodes. After deducting the copper, gold and silver which was recovered from the slags received from various shippers, the estimated production of new metals was 132,762,100 pounds of fine copper, 333,261 ounces of gold and 1,516,506 ounces of silver. The estimated recovery from Horne mine ore and concentrate was 66,164,400 pounds of copper, 269,732 ounces of gold and 660,780 ounces of silver; 186,633 tons of pyrite were recovered from the cyanide mill tailing and sold to chemical plants. The company sent prospecting parties into eight districts.

Normetal Mining Corporation Ltd.: There was a serious shortage of underground labour throughout the year with the result that production was reduced to an average of 563 tons of ore per day, or about 20 per cent less than the rate in 1942, against a capacity of 780 tons per day. It was found necessary to change to square-set stoping and by the end of the year about 85 per cent of the total ore hoisted was mined from square-set stopes. Ore reserves reached a peak in the history of the mine. Operating costs showed a substantial rise to an average of \$6.24 per ton milled largely due to lower tonnage milled on account of labour shortage, and also partly due to increased power costs and increased cost necessitated by square-set stoping. Total ore broken in 1943 amounted to 206,437 tons. Ore milled totalled 206,437 tons. Ore milled totalled 205,020 tons. Copper production amounted to 12,448,168 pounds and zinc 15,221,966 pounds, representing concentrate recoveries of 93.55 per cent and 69.75 per cent, respectively. The gold content of copper concentrates averaged 0.1227 ounces per ton and the silver content 10.01 ounces per ton.

Waite Amulet Mines Ltd.: Tonnage treated in the mill totalled 641,340, of which 123,115 tons came from the Waite mine, 85,332 tons from "C" shaft and 432,893 tons from Amulet Dufault. The average mill fee assay was: Copper 4.15 per cent; zinc 7.58 per cent; gold 0.036 ounces, and silver 1.71 ounces. The 300-ton addition to the mill was put in operation on February 1. An extensive program of exploratory diamond drilling was started in 1943 and will be continued until favourable areas of the property have been carefully tested. A contract was entered into with an American company for the sale of iron pyrite concentrate, which was previously discarded in the tailings.

Aldermac Copper Corporation Ltd.: Mining operations at the company's old property in the Rouyn area ceased October 28, 1943. It was reported that the company's new mine located near Sherbrooke, Quebec, was being brought into production in September, 1944. The ore is composed of copper, lead, and zinc sulphides, and contains appreciable amounts of gold and silver. The mill will produce copper, lead, and zinc concentrates for shipment to the United States. The proportion of metals in the sulphide is approximately 3 zinc, 1 lead, and 1 copper. A pyrites concentrates may also be produced.

Ontario.—Algoma Copper Mines Ltd.: The company shipped approximately 420 tons of copper ore to the International Nickel Company's smelter. This ore was mined at a property located in Township 1 A, Algoma district. The mine was active from August to December and was operated under contract. No gold values were reported.

Kam-Kotia Porcupine Mines Ltd.: Property located at Kamiscotia in the Porcupine district, was operated as a Government project from August 15. Milling commenced on September 1 and copper concentrates were shipped to the Noranda smelter. These shipments contained only a small amount of gold. The capacity of the mill is 500 tons per 24 hours.

Manitoba and Saskatchewan.—Hudson Bay Mining & Smelting Co. Ltd.: The tonnage of ore mined and hoisted from underground in 1943 totalled 2,258,638 tons averaging 0.113 ounces gold per ton, 1.88 ounces of silver per ton; 2.44 per cent copper and 5.5 per cent zinc. A total of 146,635 cubic yards of waste filling, consisting of smelter slag, sand, and waste rock was placed in stopes during the year. Diamond drilling or "blast hole" drilling has to a large extent replaced air machine drilling for stope mining. From 2,241,142 tons of ore milled there were produced 415,810 tons of copper concentrates assaying 0.407 ounces gold per ton, 7.28 ounces of silver, 11.53 per cent copper and 180,970 tons of zinc concentrates assaying 0.068 ounces of gold per ton, 1.71 ounces silver, 0.46 per cent copper and 46.1 per cent zinc. Flotation tailings treated in the cyanide plant totalled 1,589,713 tons, from which was recovered zinc dust precipitate containing 22,119 ounces gold, 225,388 ounces silver and 79,999 pounds copper; this material was sent to the copper converter.

The year's production of slab zinc at 108,498,410 pounds was the highest on record. The total production of gold and silver for the year from Hudson Bay materials alone was the second highest on record, while the production of copper from Hudson Bay materials alone, and from combined Hudson Bay and custom materials smelted, were both the highest they have ever been. Temporary farm labour, which was available only during the winter months for the past two years, made the labour shortage less acute. Labour shortages in the mill were accentuated by the necessity of transferring part of the crew to carry on the operation of the concentrator of Emergency Metals Ltd. Additional women were hired to offset in part the shortage created.

Emergency Metals Ltd.: Emergency Metals Ltd., organized in 1942 to mine, as a war measure, the lower grade remainder of an ore body (Mandy) which had been worked during the first World War by a predecessor company, completed its construction program and went into production in April, 1943. Ore milled amounted to 50,486 tons assaying 0.089 ounces gold per ton, 1.48 ounces silver per ton, 5.76 per cent copper and 15.5 per cent zinc. Concentrates were sold under contract to Metals Reserve Company, U.S.A. It was expected early in 1944 that the ore reserves would be exhausted during the latter part of the year.

Sherritt-Gordon Mines Ltd.: The company milled 770,099 tons of ore in 1943 compared with 750,687 in 1942. Production in 1943 comprised 26,959,203 pounds of copper, 8,061 ounces of gold, 245,405 ounces of silver and 28,706 tons of zinc concentrate. The total operating cost per ton of ore milled in 1943 amounted to \$2.329 as against \$2.421 in the preceding year. Tonnage milled in 1943 achieved a new record in spite of an unsatisfactory labour situation during a considerable part of the year. Owing to the fact that at present zinc concentrates

can be marketed at a reasonable profit, mining of the zinc ore reserve in the East mine proceeded as rapidly as possible and over 28,000 tons of zinc concentrates were shipped during the year under contract with Metals Reserve Company of Washington, D.C. No new ore was found during the year, but at the end of 1943 the average grade of ore reserves was slightly better, due to the greater part of the ore extracted during 1943 having been taken from the lower grade portions of the reserve.

British Columbia.—The property of the Britannia Mining & Smelting Co. Limited, located at Britannia Beach, was operated continuously throughout 1943. The tonnage of ore mined and milled totalled 849,147. Copper concentrates exported to the United States totalled 37,240 tons containing 10,922 ounces of gold, 77,521 ounces of silver and 16,068,123 pounds of copper. In addition, there were 746,635 pounds of copper shipped as copper precipitate. The tonnage of iron pyrite shipped amounted to 6,886 tons. The Britannia ore also contains a relatively large quantity of lead. The contract which was arranged with the Wartime Metals Corporation to cover production of concentrates remained in effect throughout 1943 and has been extended indefinitely, being, however, subject to cancellation with ninety days' notice by the Canadian Government Agency. The reduced scale of operations continued throughout the year as there was no improvement in the acute labour shortage. Production was about 50 per cent normal and exploratory work was markedly curtailed. The situation at the property (February, 1944) is such, however, that full production could be resumed quickly, whenever the operating force is increased.

Granby Consolidated Mining, Smelting & Power Co. Ltd.: Mining and milling operations were carried on throughout 1943 at Copper Mountain. Ore mined totalled 1,365,000 tons. The tonnage milled amounted to 1,363,346 and 44,320 tons of copper concentrates were exported to the United States; these contained 6,681 ounces gold, 164,744 ounces of silver and 23,335,928 pounds of copper. Owing to the shortage of labour, a considerable number of women were employed on surface work. The company operated under contracts with Canadian Wartime Metals Corporation and Metals Reserve Company, Washington, D.C.

Twin "J" Mines Limited.—Mining operations were continuous throughout 1943 at the company's property located in the Victoria Mining Division. The 125-ton mill was operated from July 19 and the tonnage of ore milled totalled 17,552. The tonnage of copper concentrates exported amounted to 540, containing 470 ounces of gold, 11,730 ounces of silver and 216,045 pounds of copper. Exports of zinc concentrates totalled 565 tons containing 85 ounces of gold, 3,797 ounces of silver and 562,176 pounds of zinc. Concentrates produced comprised 570 tons copper concentrates and 1,612 tons of zinc concentrates. The company operated under contracts with Wartime Metals Corporation and Metals Reserve Company, Washington, D.C.

Industrial Metals Mining Company Ltd.: This company conducted underground mining operations at the Little Billie mine, Texada Island, from February until the end of the year. Work was of a development nature and no commercial production was reported.

Table 70.—Capital Employed in the Copper-Gold-Silver Mining Industry in Canada, 1943 (a)

Province	Mines		Present cash value of the land (excluding minerals)	Present value of buildings, machinery, tools, equipment, etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	Total
	Operating	Producing						
			\$	\$	\$	\$	\$	\$
Quebec.....	12	6	15,501,687	9,543,998	1,113,531	1,838,916	12,933,059	40,631,791
Ontario.....	2	2	.....	615,174	39,497	.....	15,815	670,436
Manitoba.....	3	3	4,135,673	4,308,207	581,701	951,079	3,660,822	13,637,482
Saskatchewan.....	(b) 1	1	6,258,210	6,888,371	1,509,979	128,413	16,364,095	31,149,068
British Columbia*	4	3	339,027	2,831,298	797,638	342,550	4,350,846	8,661,359
Total.....	22	15	26,231,597	24,187,048	4,042,346	3,260,958	37,025,237	94,750,136

* Reports from small leasers shipping from deposits of the Consolidated Mining and Smelting Company of Canada, Ltd., in the Rossland district, are compiled as one producer; statistics relating to employment, etc., at these properties are not available.

(a) Not including smelters and refineries.

(b) 1 firm is also included in Manitoba number of mines.

Table 71.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, by Provinces, 1943*

Province	Number of employees						Salaries and wages	
	On salary	Wage-earners				Total em- ployees		
		Surface		Under- ground	Mill			
		Male	Female		Male			Female
							\$	
Quebec.....	122	473	2	1,117	228	24	1,966	3,860,733
Ontario.....	5	24		10	4		43	94,658
Manitoba.....	73	193	23	412	68	3	772	1,805,532
Saskatchewan.....	247	608	21	488	139	24	1,527	3,261,742
British Columbia.....	208	382	38	577	215	20	1,440	2,784,162
Canada.....	655	1,680	84	2,604	654	71	5,748	11,806,827

* Not including smelters and refineries.

Table 72.—Wage-earners, by Months, in the Copper-Gold-Silver Mining Industry in Canada, 1943*

Month	Surface		Under-ground meal	Mill		Total
	Male	Female		Male	Female	
January.....	1,695	71	2,878	688	38	5,350
February.....	1,718	77	2,848	669	49	5,361
March.....	1,733	82	2,790	652	54	5,311
April.....	1,684	87	2,607	649	00	5,087
May.....	1,678	86	2,508	677	65	5,014
June.....	1,769	88	2,502	665	69	5,093
July.....	1,764	85	2,470	662	75	5,056
August.....	1,651	87	2,359	641	85	4,823
September.....	1,581	89	2,427	634	86	4,817
October.....	1,609	86	2,527	648	90	4,960
November.....	1,651	89	2,703	655	88	5,186
December.....	1,608	87	2,641	647	87	5,070
Average.....	1,650	84	2,604	654	71	5,093

* Smelter employees not included.

Table 73.—Dividends Paid by Specified Copper-Gold-Silver Mining Companies

Name of firm	Dividends paid in 1943	Total dividends paid to December 31, 1943
	\$	\$
Noranda Mines Ltd.....	8,959,088	89,254,924
Waite Amulet Mines Ltd.....	2,310,000	5,280,000
Amulet Dufault Mines Ltd.....	3,168,000	5,632,000
Sherritt Gordon Mines Ltd.....	352,406	2,114,796
Hudson Bay Mining & Smelting Co. Ltd.....	5,515,946	41,369,595
Britannia Mining & Smelting Co. Ltd.....		11,327,516
Granby Cons. Mining, Smelting & Power Co. Ltd.....	202,605	11,687,609

Table 74.—Specified Data Relating to the Copper-Gold-Silver Mining Industry 1929-1943*

Year	Wage- earners	Wages paid	Average per capita wages paid	Salaried employees	Salaries paid	Total salaries and wages
	No.	\$	\$ (†)	No.	\$	\$
PRODUCING MINES—						
1929	3,036	5,465,871	1,800	174	462,268	5,928,139
1930	4,634	7,394,741	1,596	195	536,482	7,931,223
1931	2,901	4,140,890	1,427	160	465,603	4,606,493
1932	2,900	3,392,322	1,170	131	328,079	3,720,401
1933	2,590	3,550,417	1,371	123	275,650	3,826,067
1934	2,878	4,357,517	1,514	168	413,127	4,770,644
1935	2,946	4,144,095	1,407	207	473,988	4,618,083
1936	3,328	4,608,774	1,385	308	708,200	5,316,974
1937	4,618	7,019,595	1,520	436	1,058,082	8,077,677
1938	5,051	7,694,141	1,523	418	1,075,014	8,769,155
1939	5,401	8,498,360	1,573	470	1,126,561	9,624,921
1940	5,605	9,434,060	1,683	479	1,313,509	10,747,569
1941	5,324	9,249,863	1,737	524	1,428,993	10,678,856
1942	4,945	9,442,054	1,909	608	1,524,584	10,966,638
1943	5,042	9,931,712	1,970	629	1,764,200	11,695,912
Total		98,324,412			12,954,340	111,278,752
(†) Including any bonus paid.						
NON-PRODUCING MINES—						
1929	1,777	2,132,279		256	438,337	2,570,616
1930	775	1,037,743		90	187,793	1,225,536
1931	224	256,204		66	95,620	351,824
1932	33	27,439		12	32,787	50,226
1933	92	81,998		36	30,713	112,711
1934	87	65,485		36	33,672	99,157
1935	248	367,685		29	54,428	422,113
1936	84	119,084		18	37,267	156,351
1937	84	126,155		26	36,782	162,937
1938	93	129,246		15	23,064	152,310
1939	186	256,999		26	38,671	295,670
1940	18	18,746		13	11,512	30,258
1941	12	10,449		6	5,718	16,167
1942	71	107,532		22	23,242	130,774
1943	51	79,818		26	31,097	110,915
Total		4,816,862			1,070,703	5,887,565

(*) Not including smelters or refineries.

Table 75.—Taxes Paid by the Copper-Gold-Silver Mining Industry in Calendar year 1943

Dominion Income Tax, including tax on non-operating revenue	\$ 4,512,299
Dominion Excess Profits Tax	\$ 6,147,405
Provincial Tax	\$ 1,397,691
Municipal Tax	\$ 163,781
Grand Total Taxes Paid	\$ 12,221,176

Table 76.—Specified Expenditures by the Copper-Gold-Silver Mining Industry, 1942 and 1943

	1942	1943
Workmen's compensation	\$ 375,289	\$ 423,422
Silicosis assessment	102,965	119,982
Unemployment insurance	79,117	84,818
Aggregate cost of all supplies purchased	9,168,768	9,466,714
Aggregate cost of plant and equipment purchased	1,022,614	1,514,959

Table 77.—Cost of Prospecting Conducted by the Copper-Gold-Silver Mining Industry, by Provinces, 1943

Conducted in—	\$	Conducted in—	\$
Nova Scotia		Saskatchewan	
New Brunswick		British Columbia	24,898
Quebec	53,490	Yukon	542
Ontario	56,985	Northwest Territories	500
Manitoba	18,669		
		Total	155,044

Table 78.—Specified Data Relating to the Copper-Gold-Silver Mining Industry, 1929-1943 (†)

Year	Producing mines						Non-producing mines			
	Electricity purchased	Total cost of purchased fuel and power used	Hydraulic turbines used	Process supplies used	Freight on ore, etc., shipped	Smelter treatment charges (x)	Electricity purchased	Total cost of purchased fuel and power used	Hydraulic turbines used	Process supplies used
	k.w.h.	\$	h.p.	\$	\$	\$	k.w.h.	\$	h.p.	\$
1929.....	91,622,530	785,395	9,300	(+)	(+)	(+)	3,155,653	249,738	1,275	(+)
1930.....	124,395,046	1,173,447	9,300	(+)	(+)	(+)	731,964	98,815	690	(+)
1931.....	225,088,928	709,614	9,300	(+)	(+)	(+)	311,800	16,888	1,159	(+)
1932.....	127,331,868	446,736	9,300	(+)	(+)	(+)	1,584,700	16,727	609	(+)
1933.....	68,188,303	387,312	9,300	(+)	(+)	(+)	453,000	17,313	609	(+)
1934.....	90,097,659	526,941	9,300	(+)	(+)	(+)	1,108,500	15,729	.....	(+)
1935.....	91,828,181	520,724	9,300	2,892,443	(+)	(+)	1,108,500	13,428	.....	6,689
1936.....	71,134,263	441,132	9,300	3,127,527	(+)	(+)	2,253,803	54,711	.....	28,698
1937.....	199,045,597	871,002	9,300	4,808,504	344,818	9,735,199	.....	30,086	.....	43,341
1938.....	214,930,438	1,049,825	9,300	4,746,830	960,791	13,639,953	5,501,100	50,959	609	96,833
1939.....	247,180,650	1,203,878	8,900	5,539,545	1,582,350	16,587,402	2,119,520	19,645	1,250	46,071
1940.....	270,601,445	1,297,454	8,900	5,812,178	882,633	17,378,092	.....	.....	.....	.....
1941.....	251,488,789	1,264,533	10,520	5,504,530	1,873,728	25,964,492	.....	34	.....	1,425
1942.....	259,238,497	1,333,969	8,900	5,682,271	1,932,958	26,483,998	108,000	4,768	.....	21,184
1943.....	269,523,279	1,413,989	8,900	5,493,875	1,353,139	21,409,079	.....	12,721	.....	12,840
Total.....	2,601,695,473	13,425,451	.....	43,607,703	8,930,417	131,198,215	18,436,540	601,562	.....	257,081

(+) Not available.

(x) Partly conjectural.

(†) Not including smelters or refineries.

Table 79.—Shipments from Copper-Gold-Silver Mines of Canada, 1942 and 1943

—	Quantity	Value	Total Metal Content as Determined by Settlement Assay (c)				
			Gold	Silver	Copper	Sulphur	Zinc
	tons	\$	fine oz.	fine oz.	pounds	tons	pounds
1942							
12 mines shipped to Canadian plants (a)—							
Ores.....	760,973	8,771,329	146,412	318,805	28,927,383		
Copper concentrates.....	816,793	38,161,711	342,995	4,700,629	234,276,699		
Zinc concentrates.....	172,519	4,613,158	11,424	293,259	1,409,389		159,543,348
Iron pyrites concentrates.....	69,014	132,063				32,580	
Slags, residues and gold precipitates.....	193	1,440,349	35,146	227,776	129,659		
8 mines shipped to foreign plants—							
Ores.....							
Copper concentrates (f).....	101,752	7,273,864	19,892	283,596	50,619,295		
Zinc concentrates.....	92,135	7,453,208					94,931,818
Iron pyrites concentrates.....	310,479	1,302,108				150,199	
Total	2,323,888	69,147,790	553,869	5,824,065	315,362,425	182,779	254,475,166
Value of process supplies, etc. (b).....		35,459,148					
Net Value		33,688,642					
1943							
13 mines shipped to Canadian plants (a)—							
Ores.....	772,641	10,076,183	148,995	373,215	38,948,373		
Copper concentrates.....	820,759	39,210,100	320,512	4,502,041	230,639,502		
Zinc concentrates.....	181,032	5,960,291	12,397	310,210	1,656,227		187,005,660
Iron pyrites concentrates.....	65,395	129,947				32,116	
Slags, residues, bullion, and gold precipitates.....	198	1,518,423	36,749	240,302	151,001		
12 mines shipped to foreign plants—							
Ores.....							
Copper concentrates (f).....	94,714	6,238,523	20,410	299,753	45,227,248		
Zinc concentrates.....	131,418	9,589,232	85	3,797			134,809,240
Iron pyrites concentrates.....	219,181	813,623				107,339	
Total	2,285,338	73,536,322	539,148	5,729,318	316,622,351	139,455	301,814,900
Value of process supplies etc. (b).....		29,695,643					
Net Value		43,840,679					

(f) Includes some copper precipitate.

(a) Certain mines operated in the Rossland area by leasers in 1942 and 1943 treated, statistically, as one mine.

(b) Includes freight on ore shipments, smelter charges and fuel and purchased electricity.

(c) In addition, cadmium, tellurium and selenium are recovered from these ores.

Table 80.—Ores Mined, Milled, and Concentrates Produced by the Copper-Gold-Silver Mining Industry, 1929-1943

Year	Ore mined	Ore milled	Copper concentrates produced (t)	Zinc concentrates produced	Iron pyrites concentrates produced	Net value of all mine and mill shipments (c)
	tons	tons	tons	tons	tons	\$
1929.....	5,134,824	4,512,806	262,941		76,581	21,859,907(a)
1930.....	5,768,664	4,926,431	298,085	72,112	53,453	15,629,564(a)
1931.....	6,002,865	5,243,382	469,059	63,828	63,293	15,951,103(a)
1932.....	5,453,173	4,607,659	518,609	76,507	71,945	11,143,759(a)
1933.....	5,443,690	4,521,301	521,399	88,645	59,354	7,707,270(a)
1934.....	6,065,692	5,127,189	587,045	81,811	80,684	8,265,071(a)
1935.....	5,650,665	4,693,387	614,942	96,466	66,700	16,676,447(a)
1936.....	5,052,222	4,091,570	503,650	101,303	105,669	19,271,965(a)
1937.....	6,749,809	5,802,031	630,664	116,698	201,494	30,655,784(b)
1938.....	7,929,434	6,961,188	756,065	123,887	173,444	34,739,439(b)
1939.....	8,474,855	7,760,725	828,963	105,842	161,238	32,991,716(b)
1940.....	8,931,291	8,325,979	930,622	126,346	172,500	34,914,051(b)
1941.....	9,263,071	8,402,656	974,250	187,622	309,050	36,990,853(b)
1942.....	8,575,626	7,810,813 (d)	858,580	264,739	219,874	40,730,834(b)
1943.....	8,251,579	7,482,831	914,360	315,670	292,007	50,774,104(b)
TOTAL 15 years.....	102,752,460	90,275,948	9,669,234	1,821,476	2,107,286	378,301,867

(a) Value for b. mine and presumed gross value less freight and treatment charges which were not reported separately by operators prior to 1937.

(b) Gross value reported by operators less only freight and treatment costs deducted by Dominion Bureau of Statistics.

(c) Includes the value of any cyanide precipitate shipped from mills to smelters.

(d) In addition, 1,554,164 tons of tailings were retreated.

NOTE.—Values reported for shipments made to smelters operated by the same company are often nominal in nature resulting in annual variations in the distribution of production values between the mining industry proper and the non-ferrous smelting and refining industry. This explains to a considerable extent the apparent incongruities as the value data for 1938 and 1939.

Table 81.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, by Provinces, 1943

	Manitoba and Saskat- chewan	Quebec	British Columbia	Ontario	Canada
	tons	tons	tons	tons	tons
Ore mined.....	3,073,915	2,908,346	2,231,449	37,869	8,251,579
Ore milled.....	3,061,727	2,154,011	2,230,045	37,048	7,482,831
Copper concentrates produced.....	484,136	346,745	81,345	2,134	914,360
Copper precipitates produced.....			560		560
Pyrites concentrates produced.....		277,690	14,317		292,007
Zinc concentrates produced.....	221,099	92,959	1,612		315,670

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores; this is smelted in the production of blister or anode copper; also the Manitoba-Saskatchewan boundary passes through the Flin Flon mine.

Table 82.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1941

		Content				
		Gold	Silver	Copper	Zinc	Sulphur
	Tons net	fine oz.	fine oz.	pounds	pounds	tons
To CANADIAN SMELTERS						
1929—						
Copper ore.....	570,791	67,008	432,951	57,063,264		
Copper concentrates.....	117,744	9,914	227,113	35,814,481		
Zinc concentrates.....						
Pyrites.....						
1930—						
Copper ore.....	724,966	109,043	437,034	70,487,335	1,748,920	
Copper concentrates.....	172,772	39,583	659,875	46,921,698		
Zinc concentrates.....	29,809	2,870	52,950	767,000	13,478,000	
Pyrites.....						
1931—						
Copper ore.....	1,726,712	309,765	1,522,200	96,789,533	47,835,966	
Copper concentrates.....	177,211	54,337	475,920	62,557,732		
Zinc concentrates.....	63,828	5,808	128,379	1,928,000	35,056,199	
Pyrites.....						
1932—						
Copper ore.....	850,451	314,784	564,983	51,905,334		
Copper concentrates.....	451,063	117,783	1,288,360	110,256,022		
Zinc concentrates.....	76,507	7,535	157,843	2,181,377	68,258,142	
Pyrites.....	3,465					598
Precipitate.....	54	11,573	98,302	55,174		
1933—						
Copper ore.....	867,789	223,494	328,918	39,561,914		
Copper concentrates.....	495,305	156,924	1,463,446	107,886,584		
Zinc concentrates.....	80,780				55,938,867	
Pyrites.....						
Precipitate.....	65	15,030	155,941	65,873		
1934—						
Copper ore.....	868,467	162,797	282,391	33,173,070		
Copper concentrates.....	553,515	194,664	1,918,638	120,185,486		
Zinc concentrates.....	76,149	5,417	144,559	1,324,297	69,331,636	
Pyrites.....	1,199					593
1935—						
Copper ore.....	900,761	184,410	306,978	33,243,785		
Copper concentrates.....	578,206	203,509	1,753,871	123,750,525		
Zinc concentrates.....	93,195	6,482	168,298	1,591,969	84,283,903	
Pyrites.....	1,149					580
Precipitate.....	101	12,505	135,985	76,644		
1936—						
Copper ore.....	965,370	247,293	354,006	32,678,904		
Copper concentrates.....	458,065	215,183	1,586,085	85,709,434	27,715,850	
Zinc concentrates.....	100,615	6,017	176,085	1,465,980	91,008,760	
Pyrites.....	35,435					17,796
Precipitate.....	66	13,583	132,154	52,534		

Table 82.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1941—Continued

		Content				
		Gold	Silver	Copper	Zinc	Sulphur
	Tons net	fine oz.	fine oz.	pounds	pounds	tons
To CANADIAN SMELTERS—Concluded						
1937—						
Copper ore.....	943,790	165,052	388,414	47,632,125		
Copper concentrates.....	528,641	236,566	2,090,353	119,755,349		
Zinc concentrates.....	106,074	8,135	184,248	1,593,711	95,941,609	
Pyrites.....	1,037					523
Slag, precipitates, etc.....	151	31,432	130,441	112,565		
1938—						
Copper ore.....	924,236	167,179	470,745	55,558,860		
Copper concentrates.....	606,255	271,099	2,565,893	138,288,971	1,668,410	
Zinc concentrates.....	94,994	8,199	175,391	1,446,591	85,882,822	
Pyrites.....	2,088					1,011
Slag, precipitates, etc.....	234	23,916	129,478	202,519		
1939—						
Copper ore.....	868,328	173,019	440,393	60,333,576		
Copper concentrates.....	616,071	237,742	2,637,965	145,937,499	1,683,442	
Zinc concentrates.....	96,817	7,378	182,517	1,320,610	91,116,593	
Pyrites.....	2,436					1,216
Slag, precipitates, etc.....	595	24,140	133,330	557,781		
1940—						
Copper ore.....	860,237	156,857	372,408	35,648,576		
Copper concentrates.....	768,833	258,692	3,514,614	208,421,117	2,492,666	
Zinc concentrates.....	108,328	5,250	135,406	954,803	102,169,600	
Pyrites.....	36,308					17,619
Slag, precipitates, etc.....	566	23,739	120,970	530,712		
1941—						
Copper ore.....	865,921	159,647	320,994	22,516,954		
Copper concentrates.....	828,622	296,302	4,282,053	240,003,806	3,138,594	
Zinc concentrates.....	135,582	6,263	212,115	1,246,645	125,006,638	
Pyrites.....	94,818					45,446
Slag, precipitates, etc.....	189	28,893	113,299	162,553	68,337	
Total 13 years.....		4,986,811	33,602,292	2,199,719,272	1,003,824,954	85,382
To FOREIGN SMELTERS						
1929—						
Copper ore.....	3,352	192	5,876	333,719		
Copper concentrates (x).....	145,917	20,054	380,834	69,554,222		
Zinc concentrates.....						38,203
Pyrites.....	76,581					
1930—						
Copper ore.....	391	31	456	26,023		
Copper concentrates and precipitates.....	126,250	16,877	335,134	65,656,756	11,527,289	
Zinc concentrates.....	11,082					27,682
Pyrites.....	53,453					
1931—						
Copper ore.....	55	58	150	5,345		
Copper concentrates.....	71,015	5,396	164,957	35,012,918		
Zinc concentrates.....						31,771
Pyrites.....	63,293					
1932—						
Copper ore.....	54	157	28			
Copper concentrates.....	37,558	8,808	87,346	18,625,044		
Zinc concentrates.....						24,231
Pyrites.....	48,584					
1933—						
Copper ore.....	120	132	193	11,578		
Copper concentrates.....	28,541	12,933	65,969	14,654,498	9,374,675	
Zinc concentrates.....	8,929					28,178
Pyrites.....	58,604					
1934—						
Copper ore.....						
Copper concentrates.....	31,866	11,261	79,358	15,348,073	5,374,023	
Zinc concentrates.....	5,899					
Pyrites.....	35,957	2,889		84,697		4,908

Table 82.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1929-1941—Concluded

		Content				
		Gold	Silver	Copper	Zinc	Sulphur
	Tons net	fine oz.	fine oz.	pounds	pounds	tons
To FOREIGN SMELTERS—Concluded						
1935—						
Copper ore.....						
Copper concentrates and precipitates.....	62,356	13,826	86,864	19,410,963		
Zinc concentrates.....	3,191	49,696			3,606,436	
Pyrites.....	28,056					13,942
1936—						
Copper ore.....	645				727,398	
Copper concentrates.....	58,114	13,039	100,192	23,514,161		
Zinc concentrates.....						
Pyrites.....	91,777					45,374
Slag, etc.....	5,004	169	7,345	450,133		
1937—						
Copper ore.....	131	43	164	13,222		
Copper concentrates.....	97,553	15,120	266,874	48,759,159		
Zinc concentrates.....	5,871				6,041,690	
Pyrites.....	118,420					59,657
1938—						
Copper ore.....	850	479	3,191	80,245		
Copper concentrates and precipitates.....	152,955	23,759	476,207	79,978,954		
Zinc concentrates.....	5,966	103	12,577	133,526	6,270,471	
Pyrites.....	42,515					21,316
1939—						
Copper ore.....	108	101	55	5,425		
Copper concentrates.....	177,884	53,866	543,600	84,062,126		
Zinc concentrates.....	30,693			203,969	33,669,569	
Pyrites.....	225,200					113,231
1940—						
Copper ore.....	11	11	949	2,234		
Copper concentrates.....	159,316	39,952	492,352	78,778,442		
Zinc concentrates.....	30,389	456	45,552	444,808	32,558,961	
Pyrites.....	91,457					45,502
1941—						
Copper ore.....	21	5	72	865		
Copper concentrates and precipitates.....	145,549	49,802	430,563	68,313,890		
Zinc concentrates.....	51,983	471	47,051	397,450	57,515,573	
Pyrites.....	208,542					103,762
Total for 13 years.....		339,746	3,633,909	623,862,445	166,666,076	557,757

(†) As determined by settlement assay and not necessarily all recovered.

(x) Includes a relatively small quantity copper precipitate for some years.

NOTE.—For total estimated values of annual shipments see following table.

Table 83.—Ore Reserves of Specified Copper-Gold-Silver Mining Companies*

	Tons	Copper	Zinc	Gold	Silver
		per cent	per cent	ounces per ton	ounces per ton
Noranda Mines Ltd., January 1, 1944—					
Indicated above the 2,975 foot level:					
Sulphide ore over 4 per cent copper.....	5,174,000	7.03		0.157	(a)
Sulphide ore under 4 per cent copper.....	17,460,000	0.90		0.186	(a)
Silicious fluxing ore.....	768,500	0.11		0.083	(a)
Capacity of mill: 24 hours.....	3,000				
Waite Amulet Mines Ltd., December 31, 1943—					
Waite Mine—					
Copper ore.....	167,831	4.2		0.04	0.5
Zinc ore.....	111,094		11.1		

Table 83.—Ore Reserves of Specified Copper-Gold-Silver Mining Companies*—Conc.

	Tons	Copper	Zinc	Gold	Silver
		per cent	per cent	ounces per ton	ounces per ton
Waite-Amulet Mines Ltd., December 31, 1943—Con.					
Other Waite Amulet ore bodies—					
"F" orebody.....	30,000	3.2	9.9	0.01	1.01
"C" orebody.....	148,000	1.9	17.5	0.02	4.5
Amulet Dufault—					
Lower "A" orebody.....	2,872,322	5.7	4.67	0.045	1.5
Upper "A" orebody.....	141,100	2.0	6.5	0.07	1.6
Capacity of mill: 24 hours.....	1,800				
Normetal Mining Corp. Ltd., December 31, 1943—					
Capacity of mill: 24 hours.....	750				
Sherritt Gordon Mines Ltd., December 31, 1943—					
East orebody—					
Zinc ore.....	294,000	0.93	8.69	0.007	0.45
Copper ore.....	306,000	2.61	2.97	0.024	0.73
West orebody.....	2,492,000	2.45	1.99	0.017	0.57
Capacity of mill: 24 hours.....	2,000				
Hudson Bay Mining & Smelting Co. Ltd., January 1, 1943.	27,378,240 (c)	2.59	4.16	0.085	1.25
Capacity of mill: 24 hours.....	6,000				
Granby Cons. Mining, Smelting & Power Co. Ltd. 1943..	17,341,453	1.20		(a)	(a)
Capacity of mill: 24 hours.....	4,800				
Britannia Mining & Smelting Co. Ltd.....			Not reported		
Capacity of mill: 24 hours.....	6,000				
Twin "J" Mines Ltd.—April, 1943.....	100,000	2.0	7.0	(d)	(d)
Capacity of mill: 24 hours.....	125				

(a) Not reported.

(b) This makes no allowance for ore below the 2,600 foot level (lowest developed) which contains ore for a length of 1,025 feet with average width 18.4 feet averaging 3.58 per cent copper and 5.54 per cent zinc.

(c) With dilution; includes Emergency Metals Ltd.

(d) Approximately \$3.00 per ton in gold and silver.

(x) Subject to revision; taken from the Companies' annual printed reports.

Table 84.—Drilling Completed on Copper-Gold-Silver Deposits in Canada, 1945

	Footage drilled
Diamond drilling for exploration (testing only)—	
By mining companies with their own personnel and equipment.....	107,867
By diamond drilling contractors.....	152,284
Other diamond drilling—	
Blast hole diamond drilling—	
By mining companies with their own personnel and equipment.....	943,486
By diamond drilling contractors.....	32,042
Drilling by percussion or other machines.....	6,166,551 (x)

(x) Not complete as these data are not recorded by some operators.

CHAPTER THREE

THE SILVER MINING INDUSTRY IN CANADA

(a) The Silver-Cobalt Mining Industry; (b) the Silver-Lead-Zinc Mining Industry.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry inasmuch as silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with cobalt, nickel and arsenia; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear Lake, N.W.T., with silver-pitchblende. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. In Eastern Canada, lead and zinc ores have been mined in Ontario, Quebec and Nova Scotia.

It is to be noted that, in addition to its recovery from silver-lead ores, zinc is now produced in large quantities from copper-gold-silver ores mined in Quebec, Manitoba and Saskatchewan.

General statistical data contained in this chapter are essentially those pertaining to the mining of silver-cobalt and silver-lead-zinc ores and, to a lesser extent, silver pitchblende ores.

(a) The Silver-Cobalt Mining Industry

The mining of silver-cobalt ores in Canada is confined almost entirely to the district of Temiskaming in Northern Ontario. Veins containing these metals were discovered at or near the present town of Cobalt in 1903 and shipments of ores from this area have been continuous since 1904. Depletion and exhaustion of ore reserves during recent years have resulted in a relatively great decline in the production of metals from these deposits. In most instances, operations at properties, some of which were prominent as producers in the past, are conducted by lessees and shipments range from one to several hundred tons. The increased demand for cobalt as an alloying metal has, for some years, stimulated operations of a salvage nature at several of the older mines.

In order to encourage the production of cobalt for war requirements, United States and Canadian government agencies co-operated during a considerable period of the present war in the purchase of Canadian cobalt ores. Ores thus acquired were consigned in 1942 and 1943 to a United States Government agency stock pile located at Deloro, Ontario. These government purchases were discontinued in the latter part of 1943.

The only straight custom mill now at Cobalt is the old O'Brien 100-ton mill, now operated by C. W. J. O'Shaughnessy. In August of 1943 the concentrating plant at Cobalt of Cobalt Products Ltd. was taken over by Silanco Mining & Smelting Company. The Temiskaming Testing Laboratories, recently destroyed at Cobalt by fire, have been rebuilt by the Ontario Department of Mines. This plant renders a valuable service to many operators who depend on it for the sampling, valuation and often marketing of ores. Shipments of cobalt ore were also made in 1942 and 1943 from a deposit located at Werner Lake, some 40 miles north of Minaki near the Ontario-Manitoba boundary.

The number of operators reported as actively engaged in the mining or shipping of silver-cobalt ores in 1943 totalled 20; employees numbered 221 and salaries and wages paid amounted to \$290,654. The gross value of shipments totalled \$721,173 and the net value of sales was estimated at \$578,861.

Table 84(A).—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada (b), 1941-1943

	1941	1942	1943
Number of mines in operation (x).....	14	14	21
Ore mined..... tons	11,507	25,550	39,184
Ore salvaged from surface..... tons	(c)	18,532	395
Ore treated (milled) (a)..... tons	38,715	43,851	39,625
Tailings treated..... tons			8,865
Concentrates produced..... tons	1,396	1,415	1,346
Gross value of bullion, ore, concentrates and residues sold..... \$	788,815	(d) 750,250	(d) 721,173
Cost of freight..... \$	7,017	1,439	4,192
Smelter charges..... \$	18,719	16,255	15,361
Cost of fuel and purchased electricity used..... \$	40,875	68,349	74,691
Cost of process supplies used..... \$	59,761	64,000	48,068
Net value of sales..... \$	662,443	600,207	578,861

(x) All mines located in northern Ontario and includes properties on which the operations consisted only in salvaging of ore from dumps, etc.

(a) Does not include crude ore shipped.

(b) Partly estimated or conjectural as data are unobtainable from some shippers.

(c) Data not available.

(d) Includes value of ore consigned to United States Government stock pile at Deloro, Ontario.

Table 85.—Capital Employed in the Silver-Cobalt Mining Industry in Canada, 1943

Present cash value of the land (excluding minerals).....	\$ 88,707
Present value of buildings, fixtures, machinery, tools and other equipment.....	96,562
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	25,484
Inventory value of finished products on hand.....	35,048
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	341,238
Total.....	587,039

Table 86.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1943

	Number	Salaries and wages
SALARIED EMPLOYEES—		
Total..... (a)	40	\$ 59,570
WAGE-EARNERS—		
Surface..... (b)	57	234,084
Underground.....	83	
Mill.....	41	
Total.....	181	234,084
Grand Total.....	221	290,654

(a) Includes 6 females. (b) Includes 1 female.

Table 87.—Number of Wage-Earners on Payroll or Time Record at End of Month in the Silver-Cobalt Mining Industry, 1940-1943

Month	1940	1941	1942	1943				
				Mine		Mill		
				Surface		Underground		
				Male	Female	Male	Male	Female
January.....	63	140	144	46	1	90	33	.....
February.....	72	144	109	48	1	97	33	.....
March.....	79	159	115	57	1	89	34	.....
April.....	84	97	141	61	1	79	36	.....
May.....	122	139	179	47	1	94	49	.....
June.....	138	146	183	46	1	80	64	.....
July.....	144	186	200	49	1	72	54	.....
August.....	133	193	200	54	1	70	49	.....
September.....	128	181	195	81	1	83	51	.....
October.....	127	184	180	63	1	66	37	.....
November.....	88	161	172	66	1	82	36	.....
December.....	74	154	150	55	1	71	18	.....

(b) The Silver-Lead-Zinc Mining Industry

In 1943 the silver-lead-zinc mining industry of Canada reported 31 operators or firms as being actively engaged in the mining, prospecting or development of silver-lead-zinc deposits and of these operators, 24 reported commercial shipments during the year under review. Capital employed totalled \$20,603,191; employees numbered 3,097, and salaries and wages paid amounted to \$6,423,724. The cost of explosives and other process supplies consumed totalled \$2,044,367 and fuel and electricity used was recorded at \$986,519. The gross value of production as reported by the entire industry totalled \$27,072,882 and the net value of same was estimated at \$21,932,644.

Quebec.—A report on "Lead in 1943" as prepared by the Bureau of Mines, Ottawa, states:

"In Quebec, the Tetreault property near Notre-Dame-des-Anges, Portneuf county, was taken over in 1942 by Siscoe Gold Mines, Ltd., and was operated under the supervision of Wartime Metals Corporation. The lead and zinc concentrates produced are contracted to the Metals Reserve Company. Production continued throughout 1943. New Calumet Mines, Ltd., operating at Calumet Island, Pontiac county, completed the erection of a 500-ton mill, which went into production in September, 1943. The property was actively explored and developed during the past two years; lead concentrates were stock-piled and zinc concentrates exported in 1943.

"Aldermac Copper Corporation is opening up a new property at Moulton Hill, Ascot township, 4 miles from Sherbrooke. The property is being developed underground and it is expected that a new 250-ton concentrator will be in operation by June 15, 1944. The sulphide ore is composed of copper, lead, and zinc sulphides with appreciable values in gold and silver. The mill will produce copper, lead and zinc concentrates for shipment to the United States. The proportion of metals in the sulphide is approximately 3 zinc, 1 lead and 1 copper. A pyrites concentrate may also be produced.

"Golden Manitou Mines, Ltd., took over in 1941 part of the holdings, near Val D'Or, of Quebec-Manitou Mines, Limited, and in 1942 completed the erection of a 600-ton mill for the production of zinc and gold concentrates. The capacity of the mill has since been increased to 900 tons. Lead and zinc-bearing concentrates and gold precipitate were produced and shipped during 1943.

"Investigation in 1943 by Hollinger North Shore Exploration Company (subsidiary of Hollinger Consolidated Gold Mines), of its concession near the Quebec-Labrador boundary, disclosed occurrences of zinc, which will be drilled in 1944.

Ontario.—In Ontario, Lake Geneva Mining Company, Limited, continued producing lead and zinc concentrates throughout the year for the Metals Reserve Company. The operation is being carried on through Wartime Metals Corporation. An extensive exploration campaign was concluded during the year. This indicated the continuation of the veins and two new levels were opened up. The mill capacity is 100 tons of ore daily.

British Columbia.—In British Columbia, the lead and zinc concentrates produced in the concentrator at the Sullivan mine of the Consolidated Mining & Smelting Company of Canada Ltd. were shipped by rail 185 miles to the company's smelter and refinery at Tadoussac, near Trail. The Monarch mine of Base Metals Mining Corporation, Limited, was reopened in the latter part of 1939 and has been in production since January, 1940. Western Exploration Company at Silverton was re-treating the tailings accumulated during previous operations, mainly for the recovery of the zinc. The company's Mammoth mine was also in production. The Lucky Jim mine, at Zincton, was taken over late in 1940 by Zincton Mines, Limited, a new company owned by Sheep Creek Gold Mines, Limited. The mine and concentrator were in production in 1943. Reco Mountain Base Metals Mines, Ltd., a subsidiary of Gold Frontier Mines, Ltd., took over the Noble Five, Surprise, and Deadman mines, near Sardon, Slocan mining division in 1942. The properties were explored by diamond drilling and underground development in 1943. The 100-ton mill of the Noble Five was rehabilitated and started to operate in September 1943, producing lead and zinc concentrates which were shipped under contract to Metals Reserve Company of the United States.

"The Whitewater mines and mill were taken over in the fall of 1942 by Kootenay Belle Gold Mines Limited, and were put into shape for production. Retallack Mines, Limited, a subsidiary of Kootenay Belle Gold Mines, Limited, was formed in December, 1943, to take over the management of the property and production is expected early in 1944. An agreement has been negotiated with U.S. Commercial Company, a subsidiary of Metals Reserve Company, for the disposal of the lead and zinc concentrates. All the mill machinery and mine equipment has been transferred from the Kootenay Belle Gold Mines at Sheep Creek, and when added to the existing facilities of the Whitewater is expected to give an initial milling capacity of 300 tons a day.

"The Van Roi mine on Four-Mile Creek, near Silverton, was being prepared for operation in 1943, after lying idle for many years. The old mill is being re-modelled and will have a capacity of 300 tons a day. The property is being operated by Van Roi Base Metals, Limited. The Highland-Bell, located at Beaverdell, was active throughout the year.

"The Kootenay Florence mine at Ainsworth, on the west shore of Kootenay Lake, was taken over in 1943 by Wartime Metals Corporation and was operated as the Kootenay Florence Project. The mill equipment and machinery of the Ymir Consolidated Mines, Ltd. were installed in the old Kootenay Florence mill building. Production was started in the spring of 1943. Several small lead-zinc properties, mainly in the Ainsworth-Slocan district, shipped crude ore to the Trail smelter. The Reeves McDonald zinc-lead mine on the Pend d'Oreille River remained idle in 1943."

The lead smelter and the electrolytic lead and zinc refineries at Trail were in continuous operation throughout 1943. The Consolidated Mining and Smelting Company of Canada Limited reported that the production of ore from the Sullivan mine reached a record high of 243,631 tons in March, 1943; the tonnage of Sullivan ore treated in 1943 totalled 2,500,714. The grade of ore mined in 1943 was again slightly lower than in the previous year; for the first time in some years development work was insufficient to maintain the ore reserves, 1,600,000 more tons of ore being mined than were actually developed during the year.

Yukon.—A relatively small tonnage of silver-lead ores was shipped from properties located at Galena Hill in the Mayo district. The ore was mined chiefly by lessees operating on deposits formerly worked by the Treadwell Yukon Corporation, which company is now in liquidation. Shipments in 1943 were consigned to the Bunker Hill smelter, at Bradley, Idaho.

General statistics relating to the production of zinc from Canadian copper-gold-silver-zinc deposits are included in chapter two.

For statistical purposes, the data pertaining to the mining of pitchblende ores in the Northwest Territories are combined with those of the Silver-Lead-Zinc Mining Industry. Both the mine and mill of Eldorado Mining and Refining, located at Port Radium, were operated continuously throughout 1943; pitchblende concentrates were shipped to the company's radium refinery located at Port Hope, Ontario.

Table 88.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry(x) in Canada, 1942 and 1943

	Yukon and Northwest Territories	British Columbia	Quebec and Ontario	Canada
1942—Ore mined.....ton	6,669	2,810,566	134,245	2,951,480
Ore milled.....ton	6,369	2,944,620	122,425	3,073,414
Concentrates produced—Lead.....ton	60	325,597	1,920	327,577
Zinc.....ton		390,362	12,834	403,196
Pitchblende-silver.....ton	292			292
Gold precipitate.....ton			3	3
1943—Ore mined.....ton	37,371	2,708,886	506,400	3,252,657
Ore milled.....ton	32,186	2,714,329	499,380	3,245,895
Concentrates produced—Lead.....ton		292,407	5,383	297,790
Zinc.....ton		331,563	55,894	387,457
Pitchblende-silver.....ton	903			903
Gold precipitate.....ton			20	20

(x) Includes silver-pitchblende ores mined in the Northwest Territories.

Table 89.—Drilling Completed on Silver-Lead-Zinc Deposits in Canada, 1943

	Footage drilled
Diamond drilling for exploration and testing—	
By mining companies with their own personnel and equipment.....	5,591
By diamond drilling contractors.....	64,425
Other diamond drilling—	
Blast hole diamond drilling—	
By mining companies with their own personnel and equipment.....	
By diamond drilling contractors.....	96,963
Drilling by percussion or other machines.....	(x) 1,871,957

(x) Not complete as records are unobtainable at certain mines.

Table 90.—Destination of Shipments From Silver-Lead-Zinc Mines in Canada, 1942 and 1943

	Tons shipped	Gross value at shipping point	Total metal content as determined by settlement assay			
			Gold fine oz.	Silver fine oz.	Lead pounds	Zinc pounds
1942						
To Canadian smelters—		\$				
Lead ore.....	9,082	446,775	580	819,458	685,139	843,839
Lead concentrates (a).....	351,849	16,951,704	6	7,975,252	479,435,732	32,967,898
Zinc ore.....	52	2,392		2,983	8,834	37,974
Zinc concentrates (x).....	366,106	7,214,685	6	724,003	29,451,015	365,605,607
Dry ore.....	2,346	20,379	429	7,491	71,092	100,116
Gold precipitate.....	(b)	6,488	143	4,080		
Total.....	729,435	24,642,423	1,164	9,533,267	509,651,812	399,555,434
To Foreign smelters—						
Lead ore.....	469	108,563	14	158,455	611,501	
Lead concentrates.....	5,954	525,623	194	428,818	8,163,186	350,077
Zinc concentrates (x).....	45,157	2,433,515	94	145,037	598,272	49,339,769
Gold precipitate.....	3	62,870	1,163	36,955		
Total.....	51,583	3,130,571	1,465	769,265	9,372,959	49,689,846
Grand Total (gross).....		27,772,994				
Cost of freight.....		1,662,341				
Cost of fuel and purchased electricity.....		791,772				
Smelter charges.....		650,420				
Cost of process supplies.....		1,163,819				
Net Value.....		23,504,642				
1943						
To Canadian smelters—						
Lead ore.....	3,033	178,543	481	341,528	193,202	11,483
Lead concentrates (a).....	308,379	15,246,727	37	6,630,217	406,083,211	30,559,105
Zinc ore.....						
Pyrites concentrates.....	509	19,245	471	6,054		
Zinc concentrates (x).....	306,769	6,253,860	13	620,190	28,129,985	303,830,945
Dry ore.....	1,899	31,685	408	54,674	29,926	60,212
Total.....	620,589	21,730,060	1,410	7,652,663	434,436,324	334,461,745
To Foreign smelters—						
Lead ore.....	228	41,341	3	57,442	266,853	
Lead concentrates.....	8,268	937,075	7,600	492,222	10,289,890	235,785
Zinc concentrates (x).....	82,627	3,751,444	86	283,606	145,593	90,270,160
Gold precipitates.....	20	612,962	10,408	378,797		
Total.....	91,143	5,342,822	18,097	1,212,067	10,702,336	90,505,945
Grand Total (gross).....		27,072,882				
Cost of freight.....		1,655,637				
Cost of fuel and purchased electricity.....		986,519				
Smelter charges.....		453,715				
Cost of process supplies.....		2,044,367				
Net Value.....		21,932,644				

(x) Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia.

(a) Includes shipments of silver-pitchblende concentrates from Northwest Territories. Information relating to content of pitchblende is not available for publication.

(b) Data not available.

NOTE.—In addition to the metals contained in shipments listed in Table 90, there are considerable quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia. Cadmium, bismuth, antimony, tin and sulphur are also recovered from these ores (silver-lead-zinc).

Table 91. Capital Employed in the Silver-Lead-Zinc Mining Industry in Canada, 1943

Province	Number of mines	Present cash value of land (excluding minerals)	Present value of buildings, machinery, tools, equipment etc.	Inventory value of materials on hand, ore in process, fuels, etc.	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	Total
		\$	\$	\$	\$	\$	\$
Quebec.....	5	1,205,725	2,120,078	290,166	361,937	284,267	4,262,173
Ontario, Yukon and Northwest Territories (†).....	7	80,010	711,814	561,627	697	81,586	1,435,734
British Columbia (x).....	20	5,846,015	6,863,252	1,198,727	257,211	740,079	14,905,284
Total.....	32	7,131,750	9,695,144	2,050,520	619,845	1,105,932	20,603,191

(x) Data relating to several small shippers in British Columbia are unobtainable.

(†) Includes data relating to mining of pitchblende ore in the Northwest Territories.

Table 92.—Employees, Salaries and Wages in the Silver-Lead-Zinc Mining Industry in Canada, 1943

Province	On salary	Mine		Mill	Total	Salaries and wages
		Surface	Under-ground			
British Columbia.....	(a) 303	(b) 415	995	(c) 390	2,103	4,401,056
Ontario, Quebec, Yukon and N.W.T.†.....	(e) 104	(d) 285	468	137	994	2,021,795
Canada.....	407	700	1,463	527	3,097	6,423,724

† Includes data on silver-pitchblende mining operations in the Northwest Territories.

(a) Includes 38 females. (b) Includes 7 females. (c) Includes 31 females.

(d) Includes 5 females. (e) Includes 10 females.

Table 93.—Number of Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1942 and 1943

Month	1942	1943					
	Total	Mine			Mill		
		Surface		Under-ground			
		Male	Female	Male	Male	Female	
January	1,580	543	7	1,438	475	21	
February	1,611	583	6	1,474	476	21	
March	1,601	601	6	1,431	473	22	
April	1,639	631	6	1,383	475	27	
May	1,665	668	6	1,387	475	32	
June	1,807	751	10	1,439	489	36	
July	1,909	771	9	1,450	522	38	
August	1,993	785	14	1,437	506	38	
September	2,100	739	15	1,428	509	39	
October	2,174	755	14	1,468	515	38	
November	2,211	712	15	1,654	530	35	
December	2,195	720	9	1,565	498	35	
Average	1,877	688	12	1,463	495	32	

ARSENIC

Canadian production of arsenic (As_2O_3) during 1943 from domestic ores totalled 3,153,538 pounds valued at \$254,009 compared with 14,967,874 pounds worth \$652,041 in 1942. Of the 1943 output, 2,744,921 pounds valued at \$221,085 represents refined arsenic produced by the Deloro Smelting & Refining Co., Deloro, Ontario from crude arsenic recovered at the O'Brien and Beattie gold mines in the Province of Quebec together with the As_2O_3 content of crude

arsenic exported from the Beattie gold mine. The balance of Canadian production in 1943, all from Ontario, was obtained in the treatment of silver-cobalt-arsenic ores at the Deloro smelter. In addition to the arsenic recovered from Ontario and Quebec ores, there is a very considerable quantity of arsenic contained in auriferous quartz ores exported to the United States from British Columbia mines; no data are available on the possible recovery of this arsenic and the Canadian mines receive no payment for any part of the arsenic content; it is therefore not credited in 1943 as commercial production. Deposits containing arsenopyrite in association with gold occur in various other parts of Canada.

A report issued by the Bureau of Mines, Ottawa, states that the world production of arsenic is estimated by the United States Bureau of Mines as in excess of 80,000 tons compared with 64,000 tons in 1939. The principal producing countries are: United States, Mexico, Sweden, France, Belgium, Australia, Japan, Brazil and Canada. Complete data on world production of arsenic are not available at present.

"Arsenic is used chiefly in the manufacture of insecticides. It is also used in the preparation of weed killers, sheep and cattle dip, wood preservatives, and in the manufacture of glass, minor uses being in pigments, tannery supplies, and pharmaceutical preparations. Arsenic salts are used to replace creosoting in the preservation of wood. The use of arsenic to manufacture chemical warfare materials has notably increased its consumption. Calcium arsenate and, to a much lesser extent, lead arsenate are the arsenicals ordinarily used in insecticides. Paris green, which is a copper acetoarsenite, is also used as an insecticide. Magnesium arsenate and manganese arsenate have also been used for this purpose. A considerable tonnage of white arsenic, in the form of crude arsenic or as sodium arsenite is used in the manufacture of weed killers. High-grade white arsenic is used in glass as a decolorizer, opacifier and refining agent. Small quantities of arsenic are used in the paint industry, as realgar or arsenic disulphide (As_2S_2) and as orpiment or arsenic trisulphide (As_2S_3).

"Although the world consumption of white arsenic has varied greatly during the past ten years, the quoted price remained steady at 3½ cents a pound up to the middle of 1941. As most of it is a by-product of metal recovery, through necessity rather than choice, and as the potential supply is far in excess of any normal demand, there seems to be little likelihood of any sustained increase in price. The New York price remained fixed at 4 cents a pound throughout 1942 and 1943. The Canadian price of white arsenic, as given by Canadian Chemistry & Process Industries, remained at 5½ to 6 cents a pound throughout 1943."

Table 94.—Production in Canada, Imports and Exports of Arsenic, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
PRODUCTION—				
White arsenic (†).....	14,967,874	652,041	3,153,538	254,009
IMPORTS—				
White arsenic (arsenious oxide).....	2,082	203	400	124
Sulphide of arsenic.....	3,716	1,541	3,373	1,123
Soda, arseniate of, binarsenate.....	96,450	28,986	83,329	18,712
Arsenate of lead.....	18,000	1,993	4,432	484
Arsenate of lime.....	10,576	795	9,664	665
Total.....		33,518		21,108
Exports—Arsenic—Total.....	8,386,300	226,018	6,617,100	353,484

(†) Includes arsenic in ores exported from British Columbia in 1942 but not in 1943 (see text); for Canadian arsenic production in all previous years see the 1942 annual mineral production report for Canada.

Table 95.—Consumption of Arsenious Oxide and Arsenic Acid in the Manufacture of Canadian Insecticides, 1932-1943

Year	Pounds	\$	Year	Pounds	\$
1932.....	1,721,044	69,250	1938.....	3,029,145	93,873
1933.....	3,116,401	110,011	1939.....	4,287,435	132,584
1934.....	4,709,443	168,185	1940.....	3,607,444	129,265
1935.....	2,736,089	86,983	1941.....	5,707,499	212,687
1936.....	3,368,956	106,132	1942.....	6,106,887	273,919
1937.....	3,296,559	102,651	1943.....	4,807,049	211,998

NOTE.—In addition, the following calcium arsenate was used: 1940, 342,452 pounds valued at \$21,671; 1941, 509,381 pounds at \$34,704, 1942, 394,978 pounds worth \$26,773 and 1943, 383,059 pounds at \$26,373.

COBALT

Output of Canadian cobalt comes entirely from cobalt-bearing deposits located in northern Ontario and usually includes the cobalt recovered and sold in the metallic state, the cobalt content of oxides and salts sold and the metal content of cobaltiferous ores exported. No cobalt metal, oxides or salts were produced in Canada from Canadian ores in 1943 and the 175,961 pounds valued at \$191,407 credited as Canadian cobalt production during the year under review represents the metal content of Canadian ores exported. Not included in this figure is the cobalt contained in ores purchased for Metals Reserve Company of the United States. These ores were stockpiled at Deloro, Ontario and their metal content will be recorded as Canadian production when exported or treated in Canada.

Deloro Smelting and Refining Company, Limited, has the only plant in Canada that treats ores for the recovery of cobalt. The plant is located at Deloro, Ontario, and produces cobalt metal, oxides, and salts, chiefly for the British market. For the past two years the company has been treating cobalt residues from Africa and has processed little or no Canadian ores. The Canadian production of cobalt ore in 1943 was largely purchased by Deloro Smelting and Refining Company as agent for the Department of Munitions and Supply, acting for Metals Reserve Company of the United States, and was stockpiled for this account.

In the United States, most of the cobalt produced is obtained from cobalt residues imported from Africa. These are converted to metal at Niagara Falls, N.Y., and to oxide at New Brighton, Wilmington, and Canonsburg, in Pennsylvania, and at Cleveland, Ohio.

The total annual world output is estimated to approximate 6,000 metric tons. The greater part of the world's requirements are now supplied from the extensive deposits of the Belgian Congo and Northern Rhodesia, the remainder being contributed mainly by India, French Morocco, and Canada. Other producing countries are Australia, Japan, Germany, and Russia.

The Bureau of Mines, Ottawa, reports that about 75 per cent of the world production of cobalt is used in the metallurgical industry and most of the remainder in the ceramic industry. The metallurgical uses are for high-speed cutting steels; for making stellite or stellite-type alloys, which contain 45 to 50 per cent cobalt, 30 to 37 per cent chromium, and 12 to 17 per cent tungsten. There are various modifications of this composition, but all contain high percentages of cobalt. Stellite is used for cutting metals at high speed and for making permanent magnets. The use of stellite continues to spread and it is of great value in the manufacture of valves for aeroplane engines. Small quantities of cobalt used with other chemicals in nickel-plating solutions are said to produce a bright nickel electro deposit as an undercoating for later chromium plating. A certain amount of cobalt is used in electroplating and as a catalyst. Cobalt oxide is used mainly in the ceramic industry owing to its fine colouring properties. Other compounds of cobalt are used as driers in paints and varnishes.

Consumption of cobalt, chiefly in the production of high-speed cutting tools and permanent magnets, increased substantially during the past two years.

The market for cobalt is uncertain at present and will remain so until the Metals Reserve Company in Washington decides on what is to be done with the surplus stocks that have been built up.

The price of cobalt has remained fairly steady in recent years. The nominal New York price for cobalt metal remained at \$1.50 a pound and for black oxide in 350-lb. lots, at \$1.85 a pound, throughout the year. The nominal price for cobalt ore, 10 per cent grade, f.o.b. cars, Ontario, remained at \$1.10 a pound of cobalt.

Since 1904, the first year for which cobalt production was recorded in Canada, there were produced, to the end of 1943, in all forms, 34,381,103 pounds of Canadian cobalt valued at \$33,692,811.

Table 96.—Production in Canada, Imports and Exports of Cobalt, 1942 and 1943

	1942		1943	
	Quantity	\$	Quantity	\$
PRODUCTION (In terms of metallic cobalt and cobalt in oxides and salts sold and in ores exported). pounds (x)	83,871	88,444	(x) 175,961	191,407
IMPORTS—Cobalt ore.....pounds	4,336,200	1,485,370	2,236,300	785,721
Oxide of cobalt.....pounds	164	433	55	130
EXPORTS—Cobalt, contained in ore.....pounds	93,400	97,266	163,100	188,510
Cobalt, metallic.....pounds	943,632	1,471,024	911,107	1,507,635
Cobalt, alloys.....pounds	226,963	1,253,264	214,202	1,021,663
Cobalt oxides and cobalt salts.....pounds	232,808	285,424	67,040	135,630

(x) Exclusive of cobalt in ores placed on Government stock pile at Deloro, Ontario; this will be credited as Canadian production when exported or recovered in Canadian smelters. For Canadian cobalt production in previous years see the 1942 annual mineral production report.

Table 97.—Cobalt Salts Used in the Manufacture of Canadian Pigments and Paints, 1932-1943

Year	Pounds	\$	Year	Pounds	\$
1932.....	17,021	10,960	1938.....	43,703	17,993
1933.....	10,885	7,463	1939.....	52,979	21,638
1934.....	26,300	14,069	1940.....	59,332	28,111
1935.....	110,419	33,292	1941.....	74,445	39,349
1936.....	170,932	43,230	1942.....	200,228	145,433
1937.....	37,258	17,062	1943.....	179,995	75,233

SILVER

Production of newly mined silver from all types of Canadian ores totalled 17,344,569 fine ounces valued at \$7,849,111 in 1943 compared with 20,695,101 fine ounces worth \$8,726,296 in 1942. The average estimated price of the metal in Canadian funds was 45.254 cents per fine ounce in 1943 as against 42.166 cents in 1942. The greatest annual production of silver in Canada occurred in 1910, in which year an output of 32,869,264 fine ounces was recorded; the highest average yearly Canadian price per fine ounce for silver was 111.122 cents in 1919. Production of silver in Canada since 1887, the first year for which data are available, to the close of 1943, totalled 867,292,819 fine ounces valued at \$488,706,170.

The following information is taken from the review of the 1943 Silver Market by Handy and Harman, New York:

"The year 1943 proved to be an uneventful chapter in the story of silver. War conditions necessitated the continuance of Government control, both at home and abroad, over the price of the white metal and over its allocation for industrial and monetary purposes, but this control

involved no new features of importance. The only significant development during the year was the action taken by the United States Congress which made Government-owned silver available for sale or lease subject to certain restrictions. Prices in the London market did not vary throughout the year, the quotation for both spot and forward having been 23½ pence; imports and exports on private account were prohibited and, while Government operations continued, only very limited information regarding them is available.

"The making available of United States Treasury silver came at a most opportune time because there had been a shortage of newly mined metal for several months; in the case of foreign silver, priced at 45 cents, the shortage was the direct result of a decline in imports caused by Mexico's retention for coinage of an increasingly larger proportion of that country's current production; in the case of domestic silver, priced at 71.11 cents, the shortage was due to two causes: first, reduced output, occasioned by a scarcity of mine labour and materials; second, the fact that producers had reverted to making deliveries to the Treasury instead of to industry. . . . On the subject of world production, our information is particularly scanty this year and we confine our estimate to the four larger producing countries only; United States, 44,500,000 ounces; Canada, 18,500,000 ounces; Mexico, 87,000,000 ounces; Peru, 16,000,000 ounces. Compared with 1942, these figures show declines in output for the United States and Canada of 18 per cent and 16 per cent respectively, an increase in the case of Mexico of 8 per cent, and no change in Peru. For the first year since the inauguration of the silver purchase program in 1934, United States Government holdings of silver showed a decrease, and no foreign silver was purchased in 1943. . . . Of the silver consumed in the United States during 1943, approximately 65 per cent went into war production or for purposes classified as essential by the War Production Board. In these categories the largest single use was for photographic film, followed in order of quantity by silver brazing alloys and silver-lead solders, airplane engine bearings, electrical contacts and parts, military insignia, silver-plated eating utensils for the army and navy, and in considerable less volume by medical and dental products.

"In the non-essential field, the United States manufacturer of silverware and jewellery was limited throughout 1943 to using domestic silver only, and since February 25 the amount of silver for these purposes has been under quota restrictions of the War Production Board. The price at which manufacturers could obtain silver has increased during the past year and a half from the pre-war level of 35 cents per ounce to 45 cents per ounce, and for some purposes to 71.11 cents per ounce. The higher figure was established in September, 1942 by the office of the Price Administration in the case of domestic silver, and in July, 1943 by the Green Act in the case of Treasury silver. This higher price has retarded the use of silver to some extent. . . ."

Table 98.—Production of Silver From All Ores in Canada for Years Specified, 1887-1943

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1887.....	355,083	98-00	1931.....	20,502,247	29-87
1891.....	414,523	98-00	1932.....	18,347,907	31-67
1895.....	3,205,343	67-06	1933.....	15,187,950	37-83
1901.....	5,539,192	58-95	1934.....	16,415,282	47-46
1906.....	8,473,379	66-79	1935.....	16,618,558	64-79
1910 (x).....	32,569,264	53-49	1936.....	18,334,487	45-13
1911.....	32,559,044	53-30	1937.....	22,977,751	44-88
1916.....	25,459,741	65-66	1938.....	22,210,195	43-48
1920.....	16,020,657 (†)	111-122	1939.....	23,163,629	40-49
1925.....	13,330,357	100-90	1940.....	23,833,752	38-25
1926.....	23,228,988	66-06	1941.....	21,754,408	38-26
1927.....	22,736,698	56-37	1942.....	20,695,101	42-17
1929.....	23,143,291	52-99	1943.....	17,344,569	45-25
1930.....	26,443,823	38-15			

(x) Year of maximum output.

(†) Highest price per ounce recorded since 1887.

Table 99.—Production of Silver in Canada, by Provinces and Method of Computation, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
		\$		\$
NOVA SCOTIA—				
In gold bullion.....	446	188	144	65
QUEBEC—				
In anode copper.....	1,438,907	606,730	1,509,610	683,159
In gold bullion made and in concentrates exported.....	216,135	91,135	702,505	317,912
Total.....	1,655,042	697,865	2,212,115	1,001,071
ONTARIO—				
In silver recovered in Canada from cobalt ores.....	837,615	353,189	97,411	44,082
In gold bullion.....	465,275	196,188	339,640	153,701
In blister copper.....	2,188,004	922,593	1,608,787	728,040
In ores, concentrates, residues, matte, etc., exported.....	961,893	405,592	625,482	283,056
Total.....	4,452,787	1,877,562	2,671,320	1,208,879
MANITOBA—				
In blister copper.....	809,318	341,257	533,906	241,614
In gold bullion (gold mines) and ores exported.....	12,506	5,273	53,373	24,153
Total.....	821,824	346,530	587,279	265,767
SASKATCHEWAN—				
In blister copper.....	2,658,385	1,120,935	2,812,623	1,272,825
In gold bullion and in crude alluvial gold.....	5,747	2,423	1	.....
Total.....	2,664,132	1,123,358	2,812,624	1,272,825
ALBERTA—				
In alluvial gold.....	2	1	1	.....
BRITISH COLUMBIA—				
In alluvial gold.....	5,923	2,498	2,628	1,189
In gold bullion.....	82,031	34,589	30,431	13,771
In base bullion and in ores, etc., exported.....	10,508,250	4,430,909	8,962,429	4,055,858
Total.....	10,596,204	4,467,996	8,995,488	4,070,818
YUKON—				
In alluvial gold.....	17,321	7,304	8,810	3,987
In silver-lead ores exported.....	464,812	195,992	43,538	19,703
Total.....	482,133	203,296	52,348	23,690
NORTHWEST TERRITORIES—				
In pitchblende-silver ores shipped to smelters (a) and in gold bullion.....	22,531	9,500	13,250	5,996
Canada—Total.....	20,695,101	(c) 8,726,296	17,344,569	(b) 7,849,111

(a) No recovery from pitchblende ores in 1942 or 1943; includes 19 oz. in gold ores exported in 1942.

(b) Silver in all crude ores, etc., exported totalled 2,345,756 ounces.

(c) Silver in all crude ores etc. exported totalled 956,193 ounces.

NOTE.—For 1942 silver was valued at 42.17 cents per fine ounce, the average price of the metal on the New York market adjusted and expressed in Canadian funds; for 1943 the corresponding price was 45.254 cents.

Table 100.—Source of Canadian Silver Production, by Percentages, 1939-1943

Source	1939	1940	1941	1942	1943
In silver-cobalt ores.....	6.5	5.38	2.6	4.13	0.81
In base bullion (†).....	(x) 39.7	(x) 44.39	45.3	46.16	45.58
In gold ores (bullion and placer).....	4.6	3.60	4.1	3.71	3.07
In blister and anode copper.....	23.6	27.62	31.8	34.28	37.28
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores).....	25.6	19.01	16.2	11.72	13.26
	100.0	100.0	100.0	100.0	100.0

(†) Chiefly from silver-lead ores.

(x) Includes silver recovered in Canada from pitchblende-silver ores.

Table 101.—Canadian Silver Production According to Nature of Ores, by Provinces, 1943

Province	Crude placer gold	Auriferous quartz ores	Copper-gold-silver ores	Nickel-copper ores	Silver-lead-zinc ores	Silver-cobalt and other ores	Total
	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Nova Scotia.....		144					144
Quebec.....		128,561	1,501,884		581,670		2,212,115
Ontario.....		859,701	1,659	1,648,888	17,921 (x)	143,151	2,671,320
Manitoba.....		9,893	577,886				587,779
Saskatchewan.....		1	2,812,623				2,812,624
Alberta.....		1					1
British Columbia.....	2,628	379,973	307,321		8,305,566		8,995,488
Northwest Territories.....		13,250					13,250
Yukon.....	8,810				43,538		52,348
Canada.....	11,439	1,391,523	5,200,873	1,648,888	8,948,695	143,151	17,344,569

(x) Exclusive of silver in cobalt-silver ores placed on United States Government stock pile at Deloro, Ont.

Table 102.—Silver Consumed in Specified Canadian Industries, 1941 and 1942

	1942		1943	
	Fine oz.	Value	Fine oz.	Value
		\$		\$
Scientific equipment.....	(x) 744,175	295,189	702,882	279,885
Fountain pens and pencils.....			54,712	25,497
Jewellery and silverware (fine silver).....		1,476,788		1,421,459
Jewellery and silverware (silver alloys).....		754,421		837,907
Medicinal and pharmaceutical preparations (bullion).....	141,875	57,928	147,254	61,038
Miscellaneous chemicals.....	6,944	2,780		

(x) Consumed largely in the manufacture of photographic film.

Table 103.—Imports Into Canada and Exports of Silver, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS (x)—				
Silver, unmanufactured.....	30,797	12,568		
Silver, manufactures of, n.o.p.....		146,830		31,427
Toilet articles of which the most important component, in value, is sterling silver.....		14,355		254
Total.....		173,753		31,681
EXPORTS—				
Silver contained in ore, concentrates, etc.....	3,534,947	1,487,045	2,253,018	1,040,297
Silver bullion (Canadian).....	10,645,539	4,465,595	9,198,617	4,517,756
Silver manufactures.....		17,033		71,300
Total.....		5,969,673		5,629,353

(x) The following are the imports of films during 1942 and 1943: Photographers' 1942, value, \$622,706; 1943, \$407,054. Cinematograph films (positives) 1942, 4,141,479 feet, value \$333,896; 1943, 4,565,195 feet \$368,470. Films for aerial photography 1942, value \$5,416; 1943, \$65,442. Films, cinematograph (negative) value 1942, \$61,867; 1943, \$76,880. Educational films 1942, \$171,847; 1943, \$338,313.

LEAD AND ZINC

Statistics relating to Canadian primary production of lead and zinc represent the content of these metals in ores exported plus the quantity of lead in base bullion produced and refined zinc made in Canada. Refined lead is produced in Canada only by the Consolidated Mining & Smelting Company of Canada Ltd. which company operates an electrolytic lead

refinery at Trail, British Columbia. Refined zinc is produced at Flin Flon, Manitoba by the Hudson Bay Mining & Smelting Company Limited and at Trail, British Columbia by the Consolidated Mining & Smelting Company of Canada Ltd.

Compared with 1942, the production of refined metal from the Trail plants showed a substantial reduction due to the falling-off in ore receipts from the Sullivan mine; production of refined lead was 224,493 tons or about 19,000 tons less than in 1942; the zinc plant produced 152,299 tons of bar zinc or about 13,000 tons less than in 1942. Production of slab zinc at Flin Flon, Manitoba by the Hudson Bay Mining & Smelting Company Limited totalled 108,498,410 pounds in 1943 compared with 101,244,017 pounds in 1942; the 1943 output was the highest on record. The estimated average values per pound for lead and zinc in 1943, in Canadian funds, were 3.754 cents and 4 cents, respectively, compared with corresponding prices of 3.362 cents and 3.411 cents in 1942.

The Mining Journal, London, in a review of lead and zinc in April, 1943, states: "Though somewhat more information has been available in 1943 regarding wartime developments in lead and zinc, the statistics are still insufficient to warrant making any estimates of world production and consumption in the last two or three years. In general, the lead position, at any rate so far as the United Nations are concerned, has been relatively easy, though consumption has probably increased somewhat in 1943, and production and consumption are probably roughly in balance. The zinc position also in 1943 was somewhat easier than in the previous two years, and sufficient supplies of zinc have been forthcoming to meet all essential requirements."

The Bureau of Mines, Ottawa, reports that the basic uses of zinc under war conditions are the same as those in peacetime, but in all fields of use the wartime demand for the metal is exceptionally large. In peacetime, the galvanizing industry uses most of the primary and secondary output of zinc. Large quantities of the metal are used also in the brass and casting industry; as paint pigments; in radio and flashlight batteries; and in making zinc oxides. In the present war lead has been the least scarce of the metals, but as a result of direct and indirect war demands and the substitution of lead for copper and brass, consumption has been increasing. Lead is the only common metal classified in the least critical group; its use is very diversified.

The agreement made in 1939 by the large base metal producers and the Imperial Government, by which the producers were to supply the Imperial Government with copper, lead and zinc at prices which prevailed shortly before the outbreak of the war, was continued with some adjustments or revisions for increases in prices due to the increased cost of labour and materials. Canada can now furnish large quantities of these metals in the refined state, whereas in 1914 no refined copper, nickel or zinc and only a comparatively small amount of refined lead were produced in this country.

LEAD

Table 104.—Production (b) of New Lead in Canada, 1925-1943

Year	Pounds	\$	Price per pound (Canadian funds)	Year	Pounds	\$	Price per pound (Canadian funds)
			c.				c.
1925 (x).....	253,590,578	23,127,460	9.120	1935.....	339,105,079	10,624,772	3.133
1926.....	283,801,265	19,240,661	6.751	1936.....	383,180,909	14,993,869	3.913
1927.....	311,423,161	16,477,139	5.256	1937.....	411,989,484	21,053,173	5.110
1928.....	337,946,688	15,553,231	4.576	1938.....	418,927,660	14,008,941	3.344
1929.....	326,522,566	16,544,248	5.054	1939.....	388,569,550	12,313,768	3.169
1930.....	326,894,163	13,102,635	3.927	1940.....	470,850,256	15,863,605	3.362
1931.....	267,342,482	7,260,183	2.710	1941.....	460,167,005	15,470,815	3.362
1932.....	255,947,378	5,409,704	2.114	1942 (a).....	512,142,562	17,218,233	3.362
1933.....	266,475,191	6,372,998	2.392	1943.....	444,060,769	16,670,041	3.754
1934.....	346,275,576	8,436,658	2.436				

(x) Year of maximum value of Canadian lead production.

(a) Year of maximum output of Canadian lead.

(b) Primary lead in base bullion produced plus lead in ores exported.

Table 105.—Production in Canada, Imports and Exports of Lead, 1942 and 1943

	1942		1943	
	Pounds	Value \$	Pounds	Value \$
PRODUCTION—				
Quebec.....	437,634	14,713	2,435,523	91,430
Ontario.....	3,183,159	107,018	2,273,896	85,362
British Columbia.....	507,199,704	17,052,054	439,155,635	16,485,902
Yukon.....	1,322,065	44,448	195,715	7,347
Total.....	512,142,562	17,218,233	441,060,769	16,670,041
IMPORTS—				
Pig and block.....	18,084	2,186	19,481	3,561
Old and scrap.....	5,133	204	2,183	87
Bars and sheets.....	7,546	1,100	8,862	1,379
Litharge for storage batteries.....	1,904,900	169,117	2,397,300	203,677
Acetate of lead.....	215,574	26,338	62,307	8,013
Nitrate of lead.....	246,484	23,178	123,163	15,453
Other manufactures.....		81,393		229,644
Pipe lead.....			59	10
Shots and bullets.....	1,373	249	141,484	22,176
Lead arsenate.....	18,000	1,993	4,432	484
Lead tetraethyl, compounds of.....	8,795,358	3,063,925	10,550,057	3,568,496
Lead capsules for bottles.....		7,892		25,465
Lead pigments—				
Dry white lead.....	25,508	2,428	435,835	37,606
White lead, ground in oil.....	2,674	697		
Dry red lead and orange mineral.....	163,517	16,597	114,123	11,936
Total.....		3,397,297		4,127,987
EXPORTS—				
Lead, contained in ore.....	11,859,000	409,193	11,470,200	425,306
Pig lead.....	421,565,000	15,243,454	308,695,300	9,222,104
White lead.....	472,900	38,693	205,500	20,380
Total.....		15,691,340		9,667,790

Production of lead in all forms and from all types of Canadian ores from 1887 to 1943 inclusive, totalled 8,262,341,389 pounds valued at \$354,727,126.

The annual capacity for the production of refined lead at Trail, British Columbia, is approximately 244,000 short tons.

Table 106.—Refined Lead Production in Canada(x) 1929-1943

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1929.....	304,449,673	1937.....	(†) 399,394,939
1930.....	304,471,706	1938.....	(†) 400,763,914
1931.....	278,448,457	1939.....	(†) 381,137,424
1932.....	253,136,522	1940.....	(†) 440,175,333
1933.....	254,565,861	1941.....	(†) 456,054,164
1934.....	(†) 314,457,735	1942.....	(†) 486,612,849
1935.....	(†) 327,515,277	1943.....	(†) 447,742,463
1936.....	363,449,490		

(x) Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C., and also the pig lead from Galetta, Ont., until 1931.

(†) Primary lead only.

Table 107.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1942 and 1943

Industry	Items used	1942	1943
		Pounds	Pounds
Brass and copper products.....	Pig lead.....	1,780,402	1,689,325
	Scrap and other lead.....	641,465	400,760
White metal alloys.....	Pig lead.....	48,281,959	51,823,690
	Scrap lead.....	21,194,878	22,714,238
Electrical apparatus.....	Pig lead.....	39,690,349	42,055,554
	Scrap lead.....	127,733	77,422
	Other.....		
Iron and steel.....	Lead.....	6,050,628	4,281,005
Ammunition.....	Pig lead.....	10,467,968	6,883,360
Total Accounted for.....		128,235,352	130,525,354

ZINC

Table 108.—Production(x) of Zinc From All Types of Canadian Ores, 1929-1943

Year	Pounds	\$	Price per pound (Canadian funds) c.
1929.....	197,267,087	10,626,778	5-39
1930.....	267,643,505	9,635,166	3-60
1931.....	237,245,451	6,059,249	2-55
1932.....	172,283,558	4,144,454	2-41
1933.....	199,131,984	6,393,132	3-21
1934.....	298,579,683	9,087,571	3-04
1935.....	320,649,859	9,936,908	3-10
1936.....	333,182,736	11,045,007	3-31
1937.....	370,337,589	18,153,949	4-90
1938.....	381,506,588	11,723,698	3-07
1939.....	394,533,860	12,108,244	3-07
1940.....	424,028,862	14,463,624	3-411
1941.....	512,381,636	17,477,337	3-411
1942.....	580,257,373	19,792,579	3-411
1943(†).....	610,754,354	24,430,174	4-00

(x) Includes refined zinc and zinc in ores, etc., exported.

(†) Year of maximum Canadian zinc production.

The total value of Canadian zinc production since the first recording of Canadian zinc statistics in 1898, and inclusive of 1943, totalled \$256,848,376.

Table 109.—Production in Canada, Imports and Exports of Zinc, 1942 and 1943

	1942		1943	
	Pounds	Value \$	Pounds	Value \$
PRODUCTION—				
Quebec.....	73,940,811	2,522,121	128,169,810	5,126,792
Ontario.....	4,710,394	160,671	3,299,812	131,993
Manitoba.....	29,908,179	1,020,168	46,783,873	1,871,355
Saskatchewan.....	84,461,520	2,880,983	96,350,404	3,854,016
British Columbia.....	387,236,469	13,208,636	336,150,455	13,446,018
Total.....	580,257,373	19,792,579	610,754,354	24,430,174
IMPORTS—				
Zinc dust.....	7,500	920	7,500	1,014
Zinc in blocks, pigs, bars and rods, and zinc plates, n.o.p.....	171,400	20,923	138,400	26,257
Zinc in sheets and strips, and zinc plates for marine boilers.....	833,300	105,903	987,300	141,997
Zinc spelter.....	11,658,200	1,043,041	27,076,400	2,429,945
Zinc slugs for dry batteries.....	109,386	109,386	.....	64,385
Zinc white (zinc oxide).....	2,072,403	156,484	2,218,564	174,075
Zinc sulphate.....	1,364,999	45,554	708,869	31,743
Zinc, chloride of.....	342,933	18,762	189,305	11,745
Zinc, manufactures of, n.o.p.....	.....	361,708	.....	377,456
Lithopone.....	19,996,324	948,244	17,754,879	857,507
Total.....	2,810,925	4,116,154		
EXPORTS—				
Zinc, contained in ore.....	152,227,700	4,070,803	222,550,300	6,097,117
Zinc, scrap, dross and ashes.....	7,086,900	202,609	4,291,000	159,218
Zinc, spelter.....	304,317,100	10,783,049	258,629,700	10,260,030
Total.....	463,631,700	15,056,461	485,471,000	16,516,365

Canadian zinc refineries have an estimated annual capacity of 232,875 tons of cathode zinc.

Table 110.—Refined New Zinc Produced in Canada, 1933-1943

Year	Price (x) per pound cents	Short tons	Year	Price (x) per pound cents	Short tons
1933.....	3-21	91,946	1939.....	3-07	175,641
1934.....	3-04	134,917	1940.....	3-411	185,722
1935.....	3-10	149,523	1941.....	3-411	213,608
1936.....	3-31	151,103	1942.....	3-411	215,795
1937.....	4-90	158,542	1943.....	4-00	206,510
1938.....	3-07	171,932			

(x) In Canadian funds.

Table 111.—Canadian Zinc Production (Recoverable) According to Nature of Ores, by Provinces, 1938-1943

Year and Province	Recovered from copper-gold-silver ores	Recovered from silver-lead-zinc and other ores	Total
	Pounds	Pounds	Pounds
1938—Quebec.....	5,315,852		5,315,852
Manitoba.....	46,864,575		46,864,575
Saskatchewan.....	29,962,597		29,962,597
British Columbia.....		299,363,564	299,363,564
Total Canada.....	82,143,024	299,363,564	381,506,588
1939—Nova Scotia.....		9,152,856	9,152,856
Quebec.....	28,758,759		28,758,759
Manitoba.....	40,302,747		40,302,747
Saskatchewan.....	37,278,001		37,278,001
British Columbia.....		279,041,497	279,041,497
Total Canada.....	106,339,507	288,194,353	394,533,860
1940—Nova Scotia.....		4,755,502	4,755,502
Quebec.....	27,696,721		27,696,721
Manitoba.....	35,103,373		35,103,373
Saskatchewan.....	44,452,595		44,452,595
British Columbia.....		312,020,671	312,020,671
Total Canada.....	107,252,689	316,776,173	424,028,862
1941—Quebec.....	46,389,581		46,389,581
Ontario.....		1,100,949	1,100,949
Manitoba.....	34,879,239		34,879,239
Saskatchewan.....	62,142,288		62,142,288
British Columbia.....		367,869,579	367,869,579
Total Canada.....	143,411,108	368,970,528	512,381,636
1942—Quebec.....	67,064,536	6,876,275	73,940,811
Ontario.....		4,710,394	4,710,394
Manitoba.....	29,908,179		29,908,179
Saskatchewan.....	84,461,520		84,461,520
British Columbia.....		387,236,469	387,236,469
Total Canada.....	181,434,235	398,823,138	580,257,373
1943—Quebec.....	80,401,837	47,767,973	128,169,810
Ontario.....		3,299,812	3,299,812
Manitoba.....	46,783,873		46,783,873
Saskatchewan.....	96,350,404		96,350,404
British Columbia.....	461,776	335,688,679	336,150,455
Total Canada.....	223,997,890	386,756,464	610,754,354

Table 112.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1942 and 1943

Industry	Items Used	1942	1943
		Pounds	Pounds
Brass and copper products.....	Zinc ingots and slabs.....	76,990,715	84,315,181
	Zinc scrap.....	525,767	119,050
White metal alloys.....	Zinc spelter.....	26,581,060	17,795,100
	Zinc scrap.....	1,746,106	3,223,818
Electrical apparatus.....	Zinc ingots and bars.....	2,826,831	3,227,980
	Zinc sheets.....	1,477,013	1,627,460
Acids, alkalies and salts.....	Zinc metal.....	16,033,434	20,689,824
Iron and steel.....	Zinc.....	45,378,520	35,855,555
Miscellaneous chemicals.....	Zinc sheets and spelter.....	342,000	97,578
Grand Total.....		171,902,346	166,951,546

In addition, there are relatively large quantities of zinc oxide and lithopone used in the manufacture of paint.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production, prices, etc., for nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., and Clydach, Wales; during recent years matte was also exported to Norway, however, exports to that country ceased after its invasion by Germany in 1940.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 11 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production statistics on nickel, copper and the metals of the platinum group are given in this chapter.

General Review

In addition to production of nickel, copper and the platinum metals, there is an important recovery from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also salvaged in the gaseous state from waste smelter gases. The total gross value of the various primary products of this Canadian industry, considered as a whole, was estimated at \$128,583,784 in 1943 compared with \$128,340,860 in 1942.

Two companies operated both mines and metallurgical plants in the Sudbury area in 1943. The International Nickel Co. of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelt their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last named company treated their matte in a refinery located at Kristiansand, Norway, until the invasion of that country by Germany in 1940. Matte produced by the Falconbridge Nickel Mines Ltd. is now treated in the Canadian plants of the International Nickel Co. of Canada, Limited.

The relatively small amount of nickel oxide sometimes produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in Northern Ontario. Smelter matte made by the International Nickel Co. of Canada, Limited is treated in plants located at Clydach, Wales; Huntington, West Virginia; and at Port Colborne and Copper Cliff, Ontario. Converter copper made by the International Nickel Co. is electrolytically refined at Copper Cliff, and refined nickel is produced by the company at Port Colborne. In 1943 the International Nickel Company of Canada Limited shipped ore from the Gaisson, Creighton, Levack, Froid and Stobie mines, and in addition completed a very considerable amount of development work at the Murray mine located in McKim township.

In Foy township the property of Nickel Offsets Limited was operated throughout the year and crude-copper ore was shipped to the Copper Cliff smelter.

Mining operations were conducted by the Ontario Nickel Mines Limited at Moose Lake from January 1 to July 7, and trial shipments of ore were made by the company to plants of the International Nickel Company. In Norman township, the operations of the Dominion Nickel Mining Corporation were limited to prospecting and diamond drilling. At Porquis Junction in the Porcupine district, the Harlin Nickel Mines Limited operated the old Alexo nickel mine from June 1 to the close of the year; a considerable tonnage of crude nickel-copper ore was mined and shipped to the Copper Cliff smelter. The industry reported that \$27,165 were spent on prospecting in 1943.

In 1943 the industry, as a whole, employed \$167,097,138 in capital, provided employment for 14,650 persons, and distributed \$30,195,972 in salaries and wages. Fuel and electricity consumed totalled \$12,649,118 and explosives, chemicals, drill steel and other process supplies used amounted to \$17,872,418. Female wage-earners increased from an average of 96 in 1942 to 641 in 1943. Nickel output, in all forms, reached an all-time high record of 288,018,615 pounds in 1943, whereas copper production from nickel-copper ores at 276 032,919 pounds represents a 10·3 per cent decrease from the corresponding output in 1942.

Table 113.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1941-1943 (x)

	1941	1942	1943
Number of firms.....	(a) 3	(a) 4	(a) 6
Number of mines.....	6	8	10
Number of smelters.....	3	3	3
Number of copper refineries.....	1	1	1
Number of nickel refineries.....	1	1	1
Capital employed.....	\$ 140,844,747	159,777,493	167,097,138
Number of employees—On salary.....	963	1,098	1,230
On wages.....	11,796	12,680	13,420
Total.....	12,759	13,778	14,650
Salaries and wages—Salaries.....	\$ 2,831,984	3,184,248	3,414,557
Wages.....	\$ 22,438,513	25,171,893	26,781,415
Total.....	\$ 25,270,497	28,356,141	30,195,972
Fuel and purchased electricity used (2).....	\$ 10,213,183	11,188,825	12,649,118
Process supplies used (1).....	\$ 13,991,741	15,911,153	17,872,418
Cost of freight and treatment (3).....	\$		130,321
Estimated gross value of matte exported and Canadian refinery products (b).....	\$ 117,287,713	128,340,860	128,583,784
Value of production less items (1) (2) and (3).....	\$ 93,082,789	101,240,882	97,931,927

(x) Does not include data for mines, power plants, etc., operated by subsidiary companies.

(a) All in Ontario.

(b) Includes value of customs material.

Table 114.—Output From Ontario Nickel-Copper Mines and Smelters, 1941-1943 (Short tons)

	1941	1942	1943
Ore shipped from mines.....	9,969,843	12,072,485	12,920,917
Ore treated (x).....	9,974,406	12,078,722	12,912,332
Converter copper produced in Ontario (a).....	158,788	146,362	130,905
Nickel produced in Ontario (b).....	97,033	102,478	106,069
Matte exported (c).....	67,904	61,226	56,833
Nickel content of matte exported.....	43,955	40,112	37,911
Copper content of matte exported (a).....	7,735	7,582	7,532

(x) Represents the tonnage of crude ore smelted together with the tonnage of ore milled.

(a) Copper content, including copper content of Ontario ores purchased.

(b) Includes nickel content of salts and oxides produced from nickel-copper ores only.

(c) Less a relatively small tonnage of matte returned to Canada for retreatment.

Table 115.—Capital Employed in the Nickel-Copper Mining, Smelting and Nickel Refining Industry in Canada, 1943

Capital employed as represented by:	\$
Present cash value of the land (excluding minerals).....	132,119,251
Present value of buildings, fixtures, machinery, tools and other equipment.....	21,160,401
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	4,950,210
Inventory value of finished products on hand.....	8,867,276
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	
Total.....	167,097,138

Table 116.—Dividends Paid by Specified Nickel-Copper Mining Companies

	Dividends 1943	Total Dividends Paid to end 1943
	\$ (x)	\$ (x)
International Nickel Co. of Canada Ltd., only (†).....	34,512,046	332,022,035
Falconbridge Nickel Mines Ltd.....	500,637	8,636,597

(x) Canadian.

(†) Letters patent granted July 25, 1916.

Table 117.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1943

—	On salary		Mine and smelter			Mill		Total	Salaries and wages
			Surface		Under- ground				
	Male	Female	Male	Female	Male	Male	Female		\$
Salaries employees—									
Mine and mill.....	401	44						445	1,273,291
Smelters and refineries.....	609	176						785	2,141,266
Total.....	1,010	220						1,230	3,414,557
Wage-earners—									
Mine and mill.....			1,365	67	5,115	197	81	6,825	14,590,355
Smelters and refineries.....			6,102	493				6,595	12,191,060
Total.....			7,467	560	5,115	197	81	13,420	26,781,415
Grand Total.....	1,010	220	7,467	560	5,115	197	81	14,650	30,195,972

Table 118.—Number of Wage-Earners Employed in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, by Months, 1942 and 1943

Month	1942		1943	
	Male	Female	Male	Female
January.....	12,112		13,381	511
February.....	12,199		13,379	527
March.....	12,014		13,210	599
April.....	12,143		12,844	628
May.....	12,560		12,690	648
June.....	12,966		12,844	668
July.....	12,870		12,648	673
August.....	12,287		12,510	688
September.....	12,234	101	12,167	708
October.....	12,961	262	12,159	695
November.....	13,216	379	12,521	670
December.....	13,444	411	12,978	676

Table 119.—Wage-Earners, by Months, in Nickel-Copper Mines Only, 1943 (x)

Month	Mine			Mill	
	Surface		Under ground	Male	Female
	Male	Female			
January.....	1,356	66	5,635	227	81
February.....	1,372	78	5,578	237	66
March.....	1,346	66	5,465	209	74
April.....	1,373	71	5,185	204	74
May.....	1,414	67	5,034	220	88
June.....	1,426	62	5,025	196	61
July.....	1,383	63	5,045	186	93
August.....	1,358	64	4,951	172	82
September.....	1,325	66	4,769	174	82
October.....	1,346	65	4,671	176	80
November.....	1,359	64	4,797	182	76
December.....	1,318	69	5,208	179	73

(x) Included in Tables 4 and 5.

Table 120.—Wage-Earners, by Months, in Nickel-Copper Smelters and Refineries Only, 1943 (x)

Month	Male	Female	Month	Male	Female
January.....	6,163	364	July.....	6,034	517
February.....	6,192	383	August.....	6,029	532
March.....	6,190	459	September.....	5,899	560
April.....	6,077	483	October.....	5,966	550
May.....	6,022	493	November.....	6,183	530
June.....	6,197	515	December.....	6,273	534

(x) Included in Tables 4 and 5.

Table 121.—Specified Taxes Paid by the Nickel-Copper Mining, Smelting and Refining Industry, 1943 (x)

	\$
Dominion income tax, including tax on non-operating revenue.....	5,845,697
Dominion excess profits tax.....	7,222,187
Total Provincial taxes.....	1,179,576
Total Municipal taxes.....	293,880
Grand Total Taxes Paid.....	14,541,340

(x) Includes data relating only to companies who conducted both mining and smelting operations.

Table 122.—Other Expenditures (x), 1942 and 1943

	1942	1943
	\$	\$
Workmen's compensation.....	254,196	298,284
Silicosis assessment.....	56,204	40,660
Unemployment insurance.....	154,749	175,389
Aggregate cost of all supplies purchased.....	25,463,212	28,445,891
Aggregate cost of plant and equipment purchased.....	11,925,016	5,018,845

(x) Includes data relating only to companies who conduct both mining and smelting operations.

NICKEL

Production figures include nickel in matte exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts. Distribution of nickel, now restricted to essential war uses, remains entirely under the direction of governmental agencies.

Table 123.—Production of Nickel (x), From Canadian Ores, 1926-1943

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1926.....	65,714,294	14,374,163	1935.....	138,516,240	35,345,103
1927.....	66,798,717	15,262,171	1936.....	169,739,393	43,870,525
1928.....	96,755,578	22,318,907	1937.....	224,905,046	59,507,176
1929.....	110,275,912	27,115,461	1938.....	210,572,738	53,914,494
1930.....	103,768,957	24,455,133	1939.....	226,105,865	50,920,305
1931.....	65,666,320	15,267,453	1940.....	245,557,871	59,822,591
1932.....	30,327,968	7,179,862	1941.....	282,253,235	68,656,795
1933.....	83,264,638	20,130,480	1942.....	285,211,803	69,998,427
1934.....	128,687,340	32,139,425	1943.....	288,018,615	71,675,322

(x) Usually includes a relatively small quantity of nickel recovered annually from silver-cobalt ores; Canadian nickel production comes entirely from Ontario ores with the exception of 1937 when a relatively small tonnage of nickel ore was exported from a property in British Columbia.

Table 124.—Production in Canada, Imports and Exports of Nickel, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
	lb.	\$	lb.	\$
PRODUCTION—				
Nickel in matte exported.....				
Refined and electrolytic nickel produced.....	285,211,803	69,998,427	288,018,615	71,675,322
Nickel in oxides and salts sold or produced.....				
IMPORTS—				
Nickel and nickel silver in ingots.....	67,372	19,364	60,423	17,620
Nickel rods for wire (90% nickel).....	3,919	2,762	723	510
Nickel in bars and rods, strips and sheets.....	881,316	408,624	976,516	529,517
Nickel silver bars, rods and strips.....	9,446	5,259	4,612	2,594
Nickel chromium in bars.....	35,248	36,898	47,785	44,966
Nickel, manufactures of, not plated.....		78,095		45,846
Nickel-plated household hollow-ware.....		1,351		1,906
Nickel household hollow-ware.....		11		44
Nickel-plated ware, n.o.p.....		1,218,741		524,455
Total Nickel and Its Products.....		1,771,105		1,167,458
Exports—Total Metal in All Forms.....	277,589,100	68,407,207	271,094,400	68,346,346

COPPER

The peak Canadian production of copper for all time was in 1940, when the output stood at 643,316,713 pounds. Since that year, all provinces have shown a reduction in output with the exception of Saskatchewan, which has shown a steady rise. The Saskatchewan-Manitoba production is unique in mining history in that the ore body lies across the boundary of the two provinces, and while the output for Manitoba is decreasing, that for Saskatchewan is increasing.

The most important Canadian copper-bearing ore deposits are those of the Noranda and Waite-Amulet, in Québec, the nickel-copper mines of Ontario, the Sherritt-Gordon in Manitoba, the Flin Flon on the Manitoba-Saskatchewan boundary, and the Britannia and Granby in British Columbia. The Mandy mine, a producer in Manitoba during the first world war, was re-opened and made a considerable contribution to the output in that province during 1943.

Canada has two copper refineries, one at Copper Cliff, Ontario, owned by the International Nickel Company, and one at Montreal East, owned by the Canadian Copper Refiners Ltd. At the beginning of the first world war Canada had no copper refinery, whereas now she possesses excellent copper refinery facilities and large well-developed copper orebodies and smelters.

Curtailment in brass and copper was instituted by the Metals Controller through the surveillance of export licenses and through informal understanding with principal producers and fabricators. More formal methods were adopted so that consumption of brass and copper for non-essential purposes would be reduced. Control was effected through primary fabricators.

Perhaps the most interesting development during the year was the uncovering, by the Aldermac Copper Corporation, of a complex ore body containing gold, silver, copper, lead and zinc, which was not exposed at the surface but which had been discovered by a combination of geological and geophysical methods in one of the oldest mining sections of Canada, on the south side of the St. Lawrence River in Quebec. This discovery points to the possibilities in those areas of Canada where favourable geological conditions are known but where prospecting is difficult because of the overburden.

Table 125.—Production of Copper From Ontario Ores Only, 1926-1943

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1926.....	41,312,867	4,828,964	1935.....	252,027,928	19,295,965
1927.....	45,341,295	4,946,533	1936.....	287,914,078	26,898,920
1928.....	66,607,510	8,770,149	1937.....	322,039,208	41,716,364
1929.....	88,879,853	14,622,572	1938.....	309,030,106	30,405,500
1930.....	127,718,871	15,187,259	1939.....	328,429,665	32,637,305
1931.....	112,882,625	9,096,463	1940.....	347,931,013	34,742,229
1932.....	77,065,413	4,407,928	1941.....	333,829,767	33,192,644
1933.....	145,504,720	10,118,847	1942.....	308,282,414	30,625,404
1934.....	205,059,539	14,822,704	1943.....	(x) 277,840,560	32,232,027

NOTE.—Almost entirely from nickel ores. Total production of copper in Canada in 1943 from all ores and all provinces totalled 575,190,132 pounds valued at \$67,170,601.

(x) Includes 276,032,919 pounds recovered from nickel-copper ores only.

Table 126.—Total Production of New Copper in Canada, by Provinces and Method of Computation, 1942 and 1943

	1942		1943	
	Pounds	Value	Pounds	Value
		\$		\$
BY PROVINCES—				
Quebec.....	140,911,876	14,212,372	131,163,776	15,411,744
Ontario.....	308,282,414	30,625,404	277,840,560	32,232,027
Manitoba.....	47,595,586	4,800,491	38,014,872	4,466,747
Saskatchewan.....	56,781,466	5,726,979	85,948,719	10,098,974
British Columbia.....	50,015,521	5,044,565	42,222,205	4,961,109
Northwest Territories.....	74,963	7,661		
Total.....	603,661,826	60,417,372	575,190,132	67,170,601
BY SOURCES (†)				
In blister and anode copper produced.....	538,020,995	54,264,798	513,106,247	60,239,984
In ores, concentrates and copper matte exported (x).....	50,476,883	5,091,098	47,020,656	5,524,926
In nickel-copper matte exported.....	15,163,948	1,061,476	15,063,229	1,355,691
Total.....	603,661,826	60,417,372	575,190,132	67,170,601

(†) Where computed.

(x) Contains a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

Table 127.—Production (x) of Refined Copper in Canada for Years Specified

Year	Tons	Year	Tons
1915.....		1937.....	215,080
1916 (†).....	483	1938.....	227,240
1917.....	3,901	1939.....	231,684
1918.....	3,809	1940.....	261,878
1919.....	3,467	1941.....	278,224
1935.....	173,290	1942.....	268,447
1936.....	191,595	1943.....	251,495

(x) From all sources.

(†) First electrolytic copper produced commercially in Canada.

Table 128.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1940-1943

Industry	1940	1941	1942	1943
Brass and copper products (x)				
Ingots, wire bars, slabs, etc..... lb.	208,302,644	176,679,478	335,793,693	339,895,762
Scrap..... lb.	5,527,865	12,199,005	12,617,777	10,253,098
Pipe and tubing..... lb.	115,778	188,074	191,106	183,822
Plates and sheets..... lb.	570,036	971,838	846,308	804,125
Wire..... lb.	351,269	384,929	348,000	213,906
Other..... lb.	151,187	Not available		
White metal alloys—				
Scrap, all kinds..... lb.	4,098,077	10,200,476	9,660,323	9,250,095
Copper—ingots and slabs..... lb.	290,498	590,178	4,470,119	5,297,447

Table 128.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1940-1943—Concluded

Industry	1940	1941	1942	1943
Electrical apparatus and supplies—				
Castings.....lb.	136,979	480,687	143,237	107,226
Ingots, slabs, wire bars, etc.....lb.	1,675,341	2,109,395	2,036,221	1,280,078
Rods.....lb.	50,755,124	61,700,539	62,982,899	67,704,908
Scrap.....lb.	93,356	91,333	149,731	55,598
Tubing and pipe.....lb.	452,911	641,402	542,064	339,100
Sheets and plates.....lb.	575,871	846,949	883,936	910,257
Wire, bare.....lb.	6,606,363	8,607,762	7,862,294	6,826,654
Wire, enamelled.....\$	703,765	902,013	711,706	1,014,440
Wire, other insulated.....\$	1,232,526	1,577,960	1,551,529	1,317,370
Iron and steel and their products—				
Copper sheets, bars, etc.....lb.	10,841,787	17,400,122	18,629,920	15,804,341

(x) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable, duplication to this extent results from the inclusion of these rods in the Electrical Apparatus Industry.

METALS OF THE PLATINUM GROUP

Industrial uses of the platinum metals continued to expand in 1943. Palladium is second in consumption and iridium third. Osmium, rhodium, and ruthenium are as yet consumed in relatively small quantities.

The market situation in 1943 is explained by Charles Engelhard, President of Baker and Company, Incorporated, in the following, which is abstracted from his annual review:

"Platinum was used during the last year almost exclusively in connection with the war effort. Details of its applications in the war program are not available for publication at this time.

"Palladium experienced an active demand, principally for jewelry, dental alloys, and electrical contact. Restriction on use of platinum in non-essential uses resulted in a greater demand for palladium in the production of white metal jewelry. The trend in jewelry continued to favour the white metals.

"Previously overshadowed by iridium as a hardener of other platinum metals, ruthenium came into its own in that field during the last year. With iridium in short supply, the properties of ruthenium were investigated by the industry, and this member of the platinum group now fills an important place as a precious-metal hardener.

"The future for platinum metals is encouraging because of growing interest in this group by science and industry. Increased knowledge of the properties of these metals points to their greater usefulness in the chemical and allied industries in the postwar era. Expanded production of fiberglass, rayon, and electronic equipment was made possible during the last year by platinum.

"The future of palladium is viewed as bright, particularly in jewelry to supplant white gold, in dentistry to replace gold, and in the chemical industry for catalytic purposes. Current supply of palladium is ample. Palladium is quoted at \$24 an ounce troy, against \$35 an ounce for gold."

Because of its importance in the war effort, the use of rhodium for electroplating jewellery has been prohibited by the United States War Production Board. This precious metal is needed to coat reflectors in anti-aircraft searchlights and as an alloy of platinum to oxidize ammonia for the production of nitric acid.

With the exception of iridium, prices for the platinum group of metals remained virtually unchanged during 1943. The average price in New York (as given by M. & M. Markets of Eng. and Min. Journal) of refined platinum remained at \$36.000 per ounce throughout 1941 and 1942. From February, 1943, to the end of the year, the price of platinum was \$35.00 per ounce. Palladium at \$24.00 per ounce has remained stable in price since 1935. Rhodium continued to be quoted at \$125 per ounce, the same quotation prevailing since 1937. Ruthenium remained at \$35.00 throughout 1943. Osmium was quoted at \$50.00 throughout the year. Iridium was quoted at \$275.00 per ounce early in 1941, then dropped to \$175.00 in February and remained at that figure until the end of May, 1942, when the price was lowered to \$165.00 at which price it remained for the remainder of the year and throughout 1943.

The world production of platinum and allied metals is estimated to exceed 600,000 ounces. Canada has been the leading producer of platinum since 1934 when it displaced Russia; the other principal producers by order of importance being Russia, Columbia, and South Africa. Canada also leads as a producer of palladium, as a result of the great increase in recent years in the Canadian output of nickel. Owing to the disorganized state of the world markets and government restrictions on publication of statistics, accurate estimates on world production and consumption of platinum and allied metals for 1943 are not possible. The world consumption of platinum metals in 1939 was about equal to production (about 540,000 ozs.), a notable gain over the 1935 figure of consumption of 275,000 ounces.

Table 129.—Production of Metals of the Platinum Group from Ontario Copper-Nickel Ores, 1927-1943

Year	Platinum (x)		Palladium (†)	
	Fine ounces	\$	Fine ounces	\$
1927.....	11,217	716,653	11,545	554,190
1928.....	10,483	706,090	13,607	627,833
1929.....	12,491	845,057	17,318	309,289
1930.....	34,007	1,542,490	34,092	896,867
1931.....	44,725	1,595,117	46,918	1,217,717
1932.....	27,284	1,097,021	37,613	901,890
1933.....	24,746	856,190	31,009	645,043
1934.....	116,177	4,488,712	83,932	1,699,228
1935.....	105,335	3,444,455	84,772	1,962,937
1936.....	131,551	5,319,922	103,671	2,483,075
1937.....	139,355	6,751,750	119,829	3,179,782
1938.....	161,310	5,196,279	130,893	3,677,342
1939.....	148,877	5,221,712	135,402	4,199,622
1940.....	108,464	4,239,424	91,522	3,520,746
1941.....	124,257	4,747,860	97,432	3,396,304
1942.....	285,188	10,897,033	222,573	8,279,221
1943.....	219,706	8,458,681	126,004	5,233,068

(x) In addition, a relatively small quantity of alluvial platinum is recovered annually in British Columbia; such recovery in 1941 totalled 60 ounces, 1942, 40 ounces and 1943, 7 ounces.

(†) Includes other platinum metals except platinum and represents the entire Canadian production.

Table 130.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1933-1943

Year	Value	Year	Value
	\$		\$
1933.....	35,714	1938.....	85,503
1934.....	38,307	1939.....	160,688
1935.....	45,627	1940.....	148,748
1936.....	101,129	1941.....	208,318
1937.....	112,295	1942.....	361,066

Table 131.—Production of Selenium and Tellurium from Nickel-Copper Ores, 1939-1943

Year	Selenium		Tellurium	
	Pounds	Value	Pounds	Value
		\$		\$
1939.....	126,930	224,539	.....	.....
1940.....	136,350	260,429	3,491	5,607
1941.....	142,498	272,171	11,453	18,394
1942.....	76,000	145,920	9,500	15,200
1943.....	82,000	143,500	8,600	15,050

Table 132.—Production of Gold and Silver From Nickel-Copper Ores, 1939-1943

Year	Gold		Silver	
	Fine oz.	Value	Fine oz.	Value (x)
		\$		\$
1939.....	77,094	2,786,177	2,496,632	1,010,886
1940.....	90,863	3,498,225	2,803,052	1,072,167
1941.....	77,960	3,001,460	2,633,815	1,007,698
1942.....	70,861	2,728,148	2,238,177	943,839
1943.....	55,776	2,147,376	1,648,883	746,122

(x) Estimated.

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics Showing Production by Provinces and Prices on Aluminum, Antimony, Barium, Beryllium, Cadmium, Chromite, Iron Ore, Pig Iron and Ferro-Alloys, Steel and Rolled Products, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Radium, Selenium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Indium, Vanadium and Zirconium.

1. General Review

The mining of certain metal-bearing ores, other than those commonly classified as gold, silver, copper, nickel, cobalt, lead and zinc, have been grouped, for statistical purposes, as a single industry, by the Dominion Bureau of Statistics. Their production in some instances is confined to a relatively few operators and the annual extraction of certain types often fluctuates in an erratic manner according to demand and supply. Included in this report, with the finally-revised statistics relating to the Canadian production of these ores or metals, are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals and metal-bearing ores produced in Canada during 1943 and classified as miscellaneous include antimony, bismuth, cadmium, chromite, iron ore, magnesium, manganese ore, mercury, molybdenite, pitchblende, selenium, tellurium, titanium ore, tin and tungsten concentrates. In addition to particulars relating to these metals or minerals, the bulletin contains notes of a summary nature on aluminum, beryllium, lithium, vanadium and a few of the rarer metals.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and, for this reason, such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

The number of firms reported as active in the miscellaneous metals mining industry during 1943 totalled 54; capital employed amounted to \$15,603,307 and \$4,295,153 were distributed in salaries and wages to 1,964 employees. The cost of fuels, process supplies, freight and treatment, etc., consumed aggregated \$2,540,873, and the gross value of production totalled \$9,062,368; the corresponding net value of same was estimated at \$6,521,495.

ALUMINUM

The reduction of aluminum ores and the production of primary aluminum metal in Canada is confined to the province of Quebec. In this province the Aluminum Company of Canada Limited operates an ore treatment plant at Arvida and reduction works at Arvida, Shawinigan Falls, La Tuque, Isle Maligne and Beauharnois. These were all in continuous production throughout 1943 with the exception of Isle Maligne where metal output commenced in August. Secondary fabricating plants are also operated by the company at Shawinigan Falls in Quebec and at Toronto and Kingston in Ontario. No aluminum ores are mined in the Dominion and Canadian production of aluminum represents the recovery of the metal from foreign ores. During recent years imports of bauxite (aluminum ore) into Canada have come largely from British and Dutch Guiana with lesser quantities from the United States. At Arvida, Quebec, the bauxite is treated by a standard chemical process to remove impurities prior to its reduction to the metal. Cryolite, necessary in the production of aluminum, is largely imported from Greenland; synthetic cryolite is also used in making aluminum. A very large amount of electrical energy is utilized in the production of new aluminum metal from bauxite concentrates and the extensive expansion in the development of hydro power resources recently completed in the Saguenay district of Quebec has provided the aluminum industry with a greatly increased supply of electrical power.

The principal bauxite producing countries are France, Hungary, United States, Yugoslavia, Italy, British Guiana, Dutch Guiana and Russia. Complete data relating to aluminum and bauxite production by countries have not been available since 1938. Canadian production of new aluminum during 1943 totalled 991,499,296 pounds compared with 681,192,951 pounds in 1942 and 93,812,965 pounds in 1937. The output during 1943 was the largest ever attained by the Canadian aluminum industry.

According to the United States Bureau of Mines, the production of aluminum in the United States during 1943 totalled 920,179 short tons, exceeding the previous peak reached in 1942 by nearly 77 per cent; apparent United States consumption of primary aluminum in 1943 totalled an estimated 959,600 tons compared with 302,788 tons in 1941. Of the primary and secondary aluminum consumed in the form of fabricated products, about 70 per cent went into aircraft construction in airframes, landing gear, engines, propellers and fittings; the bulk of the remainder was consumed in ship construction, tank and truck engines, ordnance and other military uses, while only a minimum of essential civilian needs were met.

The Mining Journal, London, estimates that at the end of 1943 existing world capacity for production of aluminum, which was at last sufficient to meet all consumption needs, was probably not far short of 2 million tons, and total world production in 1943 can hardly have been less than 1½ million tons.

Aluminum prices, New York, January, 1944, were: per pound delivered, commercial and mill ingot, 99 per cent, 15 cents; in pigs, 14 cents. The London home market, ingot £110 per long ton (nominal).

Data relating to employment, etc., in the Canadian aluminum industry are included with those of the Canadian non-ferrous smelting and refining industry, and are therefore not included with corresponding statistics shown in this report.

Table 133.—Production of Primary Aluminum in Canada, 1934-1943

Year	Pounds	Year	Pounds
1934.....	34,865,362	1939.....	165,680,869
1935.....	46,342,747	1940.....	218,288,565
1936.....	59,280,250	1941.....	427,746,554
1937.....	93,812,965	1942.....	681,192,951
1938.....	142,407,743	1943.....	991,499,296

Table 134.—Imports of Aluminum and Bauxite Into Canada, 1942 and 1943

Item	1942		1943	
	Cwt.	Value	Cwt.	Value
		\$		\$
Alumina.....	1,573	25,041	1,780	31,795
Bauxite ore.....	26,170,948	11,711,899	60,211,389	21,242,907
Cryolite.....	507,407	1,573,105	448,521	1,893,762
Aluminum scrap.....	1	58	23	650
Aluminum pipes and tubes.....	80	903	1,548	17,013
Aluminum angles, channels and beams.....	67	3,281	7,481	355,880
Aluminum bars, rods and wire.....	27,775	824,507	22,270	533,720
Aluminum leaf.....		3,052		3,054
Aluminum pipes and tubes.....	490	28,286	1,429	129,718
Aluminum plates, sheets and strips.....	457	25,191	12,578	438,034
Aluminum powder.....	8.5	214	38.5	2,083
Aluminum wire and cable.....	5	210	7	285
Aluminum household hollow ware.....		23,602		3,551
Aluminum manufactures n.o.p.....		321,940		489,593

Cwt. = 100 pounds.

Table 135.—Exports of Aluminum From Canada, 1942 and 1943

Item	1942		1943	
	Cwt.	Value	Cwt.	Value
		\$		\$
Aluminum scrap.....	54	556	2,005	18,305
Aluminum in bars and ingots.....	6,289,666	112,154,078	7,507,670	124,460,894
Aluminum wire and cable.....		11,785		2,082
Aluminum manufactures, n.o.p.....		5,108,108		4,780,904

Cwt. = 100 pounds.

The Engineering and Mining Journal, Metal and Mineral Markets, New York, September 7, 1944 stated: "In announcing cutbacks in production of aluminum on August 30, involving about 30,000,000 pounds of ingot a month, War Production Board (U.S.A.) officials said that scheduled imports from Canada had been reduced sharply for the remainder of 1944 and that delivery of 250,000,000 pounds of Canadian metal under contract had been postponed indefinitely".

Table 136.—Consumption of Aluminum in Specified Canadian Industries, 1942 and 1943

Industry	1942		1943	
	Pounds	Cost at works	Pounds	Cost at works
		\$		\$
Aluminum products (a).....	62,442,663	12,684,015	70,423,825	14,676,377
White metal alloys*.....	1,357,782	276,709	1,108,762	212,754
Electrical apparatus and supplies.....		944,603		1,019,525
Brass and copper products (b).....	3,108,839	911,757		799,339
Iron and steel products (b) (c).....	8,892,268	2,740,947	11,487,493	3,373,018

(a) Largely for the manufacture of cooking utensils, cable, etc.

* In addition in 1942 there were consumed 4,522,083 pounds of scrap valued at \$500,596, and in 1943, 5,816,697 pounds at \$531,248.

(b) Includes scrap.

(c) Includes industries manufacturing cooking and heating apparatus, sheet metal products, etc.

ANTIMONY

Production of antimony metal in Canada during 1943 totalled 1,114,166 pounds valued at \$189,408 compared with 3,041,108 pounds worth \$516,988 in 1942. Production in both years, with the exception of 78 pounds contained in crude ore exported from Yukon in 1942, represents antimony electrolytically refined by the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia; the metal is recovered at Trail as a by-product from the flue dust of the company's silver refinery.

Antimony ore in the form of stibnite occurs in various parts of Canada and for a number of years prior to 1917 small amounts of refined antimony and of antimony ore were produced intermittently in the Maritime Provinces. Small shipments of antimony ore have also been made during recent years from the Fort St. James district of northern British Columbia, Nova Scotia, and from the Yukon. In 1942 an antimony deposit at Gates Lake, in the Kenora district of Ontario, was investigated. No crude antimony ores were commercially produced in Canada in 1943.

The world production of antimony in 1938 (1939-1942 figures not available), as published by the United States Bureau of Mines, amounted to about 38,000 tons. The production in 1937 was 42,100 tons, the highest figure since the 1914-1918 war years. The decline in output from China has been more than made up by the large increase in production in other countries. World production at present is probably in excess of 50,000 tons a year.

Most of the production of antimony has come from China, although Bolivia and Mexico have been important producers for years. In recent years, there has been a marked increase in output from Bolivia, Mexico, Yugoslavia, Algeria and, to a lesser extent, from several other countries. In 1939 Bolivia produced 29 per cent of the world output of antimony, Mexico, 23 per cent; China, only 20 per cent; and Yugoslavia, 10 per cent. Prior to the war, most of the refined antimony was produced in the United States, Great Britain, France, and Belgium from ores of foreign origin.

Canada's requirements are now supplied mainly from the electrolytic plant at Trail, British Columbia, according to the Bureau of Mines, Ottawa.

Antimony is an important war metal. It is used largely in alloys for storage-battery plates, bearing and babbitt metals, solder, rubber goods, paints and fixtures. The use of antimony in the manufacture of chemicals increased considerably during the past two years. The principal compound is the oxide of antimony, which is employed extensively as a pigment in sanitary enamelware and nitrocellulose enamels.

The New York price of antimony metal (ordinary brand) in 1943 remained fixed at 16 cents a pound throughout the year. The price for Chinese brand, duty paid, remained at 16.5 cents throughout the year. The price of antimony ore, c.i.f. New York in 1943, per unit of antimony contained was; for 50 to 55 per cent Sb., \$2.10 to \$2.20; for 55 to 60 per cent Sb., \$2.15 to \$2.20; and for 60 to 65 cent Sb., \$2.20 to \$2.30.

Talbe 137.—Antimony Produced in Canada, 1937-1943

Year	In Ores Exported		Metal Produced in Canada		Total	
	Pounds	\$	Pounds	\$	Pounds	\$
1937.....	48,163	7,394			48,163	7,394
1938.....	24,560	2,200			24,560	2,200
1939.....	25,405	3,139	1,200,180	148,330	1,225,585	151,469
1940.....	44,700	3,800	2,549,792	392,668	2,594,492	396,468
1941.....	15,292	2,141	3,189,785	443,770	3,185,077	445,911
1942.....	78	13	3,041,030	516,975	3,041,108	516,988
1943.....			1,114,166	189,408	1,114,166	189,408

Table 138.—Antimony Used in Specified Canadian Industries, 1942 and 1943

Industry	1942		1943	
	Pounds	\$	Pounds	\$
White metal alloys—Regulus.....	1,818,370	264,838	1,814,414	269,718
Antimony ore.....				
Electrical apparatus and supplies.....	234,545	35,200	251,763	39,455

Table 139.—Imports of Antimony and Specified Antimony-Bearing Products Into Canada, 1942 and 1943

	1942		1943	
	Pounds	\$	Pounds	\$
Antimony of regulus of, not ground, pulverized or otherwise treated.....	100	21	240,700	38,755
Antimony oxide and titanium oxide (x).....	14,642,708	1,423,042	16,889,500	1,533,462
Antimony salts—tartar emetic, etc.....	31,927	12,331	10,990	6,006
Antimony salts for dyeing.....				
Type metal in blocks, bars, plates and sheets.....	10,097	1,524	268	63
Plates, cylinders (engravers).....		152,260		144,952
Stereotypes for books (sq. inches).....	1,286,933	115,686	1,756,520	131,684
Stereotypes for advertisements (sq. inches).....	1,779,661	74,529	1,827,222	78,143
Printing plates for publications.....		125,234		162,648
Storage batteries and parts.....		401,945		513,463

(x) Including white pigments containing not less than 14 per cent by weight of titanium.

BARIUM

A report on barium minerals by the Imperial Institute, London, contains the following information:

"A series of lead-calcium-barium alloys known in some cases as Frary metal and others as Ferry metal, are used for bearing purposes. The amount of barium is about 2 per cent and the bulk of the alloy is lead. The alloys are manufactured electrolytically from molten chlorides using a cathode of molten lead, and are used in the same manner as other 'white' metals. Aluminium and barium form a series of alloys which have greater fluidity than pure aluminium. A range of barium-aluminium and barium-magnesium alloys are being produced by an English firm under the trade names 'Baral' and 'Barmag'. The proportion of barium varies up to as much as 50 per cent, but the consumers in the wireless valve trade usually require the 'Baral' alloy to contain 45 to 50 per cent of barium and the 'Barmag' alloy to carry 25 to 30 per cent barium. With nickel, barium forms an alloy (0.2 per cent barium) which is stated to exhibit greater resistance to the action of hot corrosive gases than does pure nickel, and on this account it has been used for the manufacture of sparking plug electrodes.

"The metal can be prepared by heating barium oxide (BaO) and peroxide (BaO_2) to 1350°C . in an electric furnace, with a metal having a high heat of oxidation, aluminium being suitable for this purpose. Barium is an extremely active deoxidizer, combines with many gases and in the radio industry is inserted, in the form of copper-clad wire, into valves (tubes) to remove the last traces of gas."

Barium has been produced in the United States, Germany, France and Great Britain, but not yet commercially in Canada. "Mineral Industry" reported in 1936 that the price of barium has been continuously reduced and it is probably now available at \$5.00 per pound or less.

BERYLLIUM

The principal ore of beryllium is the mineral beryl— $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. Beryl usually occurs in pegmatites and is sometimes recovered as a by-product in the mining of the feldspar and mica content of these rocks. No commercial production of beryl has ever been officially reported in Canada.

A report "Beryl in 1943", prepared by the Bureau of Mines, Ottawa, contains the following information:

"In Ontario, the most important occurrence is near Quadville, in Lyndoch township, Renfrew county, and this is probably the richest known Canadian concentration of beryl. The beryl-bearing pegmatite is believed to extend for a considerable distance along the strike, but owing to heavy overburden it is exposed at only two points about two miles apart. The property is owned by Canadian Beryllium Mines and Alloys, Ltd., 901 Royal Bank Building, Toronto, who have recovered a few tons of cobbled crystals, and stockpiled about 200 tons of rock that will require milling to recover the contained beryl. The mine has been inactive since 1940. In 1943, a detailed examination of the main working at the east end of the property was made by officers of the Bureau of Mines, Ottawa, and of the Metals Controller's Office, in an effort to appraise the economic possibilities of the deposit. The examination revealed an average content of 0.188 per cent of beryl in the total rock excavated, with a maximum for the richest quarry sections of 1.24 per cent. The grade of selected clean beryl crystals was 10.41 per cent BeO . Universal Light Metals Company, 28 James Street South, Hamilton, Ontario, has announced plans for the development of ground adjoining the Canadian Beryllium property.

"No figures of world production of beryl are available. The mineral, however is produced on a very small scale, and the estimated output in 1940 was only about 2,500 tons. Because of increased demand and higher prices, production may have risen slightly since then.

"Brazil and Argentina are the present leading sources of beryl, and production in both countries has increased considerably in the past few years.

"The leading users of beryl on the American continent are Beryllium Corporation of Pennsylvania, Temple (Reading), Pennsylvania, and Brush Beryllium Company, 3714 Chester Avenue, Cleveland, Ohio, both of which are engaged in treating the mineral for the production of metal, alloys, and compounds. Beryllium oxide also is produced by Clifton Products Incorporated, Painesville, Ohio; and a plant for the manufacture of oxide and carbonate was being built in 1941 at Harbor City, California, by the Calloy Company.

"Importation of beryl into the United States, and purchase of the mineral, have been restricted to Government agencies, or their authorized representatives. Contracts for sale and export of beryl from Canada for United States Government account may be negotiated through the Metals Controller, Ottawa. All such exports are subject to special export permit. From February until October, beryllium was placed in Group I (supply insufficient for war and essential industrial needs) of the list of critical materials issued by the Conservation Division of the United States War Production Board, but in the latter month it was moved down into Group II, comprising materials in adequate supply for current requirements.

"In the latter part of 1942 the price of beryl was stabilized by the United States Government at \$8.33 per unit of contained BeO, equivalent to \$83 and \$100 per ton for 10 per cent and 12 per cent grades, respectively, this price being for purchases for Government account, f.o.b. New York. In 1943, quotations for Metals Reserve Company account were raised to \$120 per ton, United States funds, for clean, cobbed crystals of 10 per cent grade, f.o.b. specified Purchase Depot. A premium or penalty of \$12 per ton was provided for each one per cent BeO above or below 10 per cent, the minimum acceptable grade being 8 per cent. These prices were made effective until December 31, 1943.

"The price of beryllium-copper master alloy, containing 4 per cent beryllium, has remained unchanged for some time at \$15 per pound of contained Be. The base price of beryllium-copper-cobalt alloys, with from 0.5 to 3.75 per cent Be content, ranged from \$0.85 to \$2.00 per pound as strip, rod or wire in 1943. Beryllium-iron, beryllium-nickel, and beryllium-aluminium sold at \$47.00 per pound of contained Be, in minimum 5-pound lots, and at \$50.00 for small quantities. Beryllium metal, 96 per cent pure, was quoted at \$47.00 per pound for lump and turnings and \$50.00 cast in bars. Calcined beryllium oxide continued firm at \$4.00 per pound."

According to "Metal and Mineral Markets", New York, (May 25, 1944), the demand for beryllium-copper continued at a brisk pace, and the problem of obtaining sufficient quantities of beryllium ore was receiving increased attention from the United States War Production Board. To stimulate production further, Metals Reserve Company has instructed its agents to pay up to \$14.50 per short ton unit of BeO, equivalent to \$145.50 per ton, on acceptable ore containing 10 per cent BeO; the previous purchasing price was \$120 per ton. Before the war market quotations varied between \$30 and \$35 per ton, depending on the grade.

BISMUTH

Production of bismuth in Canada during 1943 totalled 407,597 pounds valued at \$562,484 compared with 347,556 pounds worth \$479,627 in 1942. Production during recent years usually consisted of the metal recovered from silver-lead ores smelted by the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia, together with the bismuth content of a silver-lead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario. Production in 1943 came entirely from the Trail metallurgical plants. The total output of bismuth in the Dominion to the end of 1943 amounted to 2,352,945 pounds worth \$2,909,279.

Statistics of the world production of bismuth are incomplete, but the output is estimated at about 1,500 tons annually. The United States, Peru, Canada, and Mexico, supply about 90 per cent of the world output, their order of importance as producers being as given. The remainder of the output is obtained from Argentina, Australia, Belgium, Bolivia, China, France, Germany, Japan, Spain, and other countries.

The demand for bismuth increased considerably during the war period owing to its greater use in metallurgical and pharmaceutical applications. Bismuth is used mostly in the manufacture of pharmaceutical products. A much larger portion than formerly is now used in the making of so-called fusible or low-melting alloys. Fusible bismuth alloys usually include lead, tin, cadmium, mercury, or antimony. An alloy of bismuth, lead, tin, and antimony has been introduced for use in mounting dies and punches. Alloys containing bismuth are used to a greater extent than formerly in the aircraft, machine tool, munitions, and other industries. Additions of 0.1 to 1.5 per cent bismuth to stainless steel, copper and aluminum alloys improve machinability. There are numerous alloys of bismuth containing from 33 to 56 per cent bismuth.

The price of bismuth in 1943 (London price in Canadian funds) remained at \$1.38 a pound. The price at New York remained fixed at \$1.25 a pound throughout 1943. The American product is protected by a duty of 7½ per cent ad valorem. For several years the price has been well controlled.

Imports of bismuth salts into Canada during 1943 were appraised at \$15,675 compared with \$11,758 in 1942; there were no imports of bismuth metal in 1943 and only 5 pounds valued at \$11 in 1942. Data relating to the bismuth content of alloys imported are not available.

Table 140.—Production of Bismuth in Canada, 1930-1943

Year	Pounds	\$	Year	Pounds	\$
1930.....	12,732	6,366	1937.....	5,711	5,654
1931.....	118,207	157,650	1938.....	9,516	9,754
1932.....	16,855	7,340	1939.....	409,449†	466,362
1933.....	78,303	81,526	1940.....	58,529	81,004
1934.....	253,644	301,215	1941.....	7,511	10,396
1935.....	13,797	13,245	1942.....	347,556	479,627
1936.....	364,165	360,524	1943.....	407,597	562,484

(†) High record output.

Table 141.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1942 and 1943

Item	1942		1943	
	Pounds	\$	Pounds	\$
Bismuth metal.....	24,420	30,534	56,019	70,107
Bismuth salts.....	18,153	35,793	22,080	43,786

Canadian white metal alloy foundries consumed approximately 25,979 pounds of bismuth metal in 1942 and 55,115 pounds in 1943.

BORON

According to the United States Bureau of Mines, boron alloys are supplied by United States manufacturers, small quantities being used in the non-ferrous metals industries and in steel making. In cast iron, boron opposes graphitization on solidification and exerts an energetic whitening effect, producing a hard strong iron but reducing malleability. Recently boron has been found to be one of the so-called minor elements that stimulate plant growth and inhibit the development of certain plant diseases.

"The Mineral Industry" reported in 1941 that tests demonstrated that the use of boron deoxidizers and the incorporation of 0.002-0.007 per cent boron in 0.4 per cent carbon steel increases the hardenability, ductility and toughness; the boron is best supplied as a complex alloy of B-Mn-Si-Ti, rather than as ferroboron.

Boron carbide, boron carbide shapes and calcium boride are now produced in Canada.

World reserves of boron minerals are abundant, but known sources are confined to a few countries, chiefly the United States, Chile, Argentina, Peru, Italy and Turkey, although Borax also has been reported in Tibet, Persia, India and Ceylon.

Imports of Borax into Canada during 1943, in packages of 25 pounds or over, totalled 9,482,003 pounds valued at \$288,867.

CADMIUM

Cadmium production in Canada represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1935 came entirely from the treatment of zinc-bearing ores at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. The commercial production of the metal from the copper-gold-silver-zinc ores of the Flin Flon mine was commenced in Manitoba for the first time in 1936.

The output of new cadmium in the Dominion in 1943 totalled 786,611 pounds valued at \$904,602 compared with 1,148,963 pounds worth \$1,355,776 in 1942; of the 1943 production 598,675 pounds valued at \$688,474 were recovered from British Columbia ores treated at Trail; 20,985 pounds at \$24,130 from Manitoba ores, and 166,955 pounds worth \$191,998 from Saskatchewan deposits. The production of cadmium at the Flin Flon plants of the Hudson Bay Mining and Smelting Company Limited is proportioned between Manitoba and Saskatchewan owing to the fact that the interprovincial boundary intersects the ore body of the Flin Flon mine.

Cadmium is consumed largely in the manufacture of alloys and for plating, also in the making of such pigments as cadmium lithopone, cadmium yellows, etc. A relatively large quantity of the metal is used in the production of bearing metals for high-speed internal combustion engines.

The world production is estimated at 7,500 short tons, the production in 1938, the latest year for which figures are available, being 4,200 short tons. The chief producing countries in order of output are: the United States, Germany, Canada, Mexico, Belgium, Australia (Tasmania), Poland, Norway, England, Russia, and France. The Mexican output is contained in ores exported for treatment in various countries.

Production is limited entirely to the by-product recovery from electrolytic zinc and from the manufacture of lithopone, and is thus dependent on the output of these products.

The following is from the annual 1944 review of the "Mining Journal, London":

"The shortage of cadmium in the United States in 1943, it was disclosed, was principally due to the high consumption of the metal by the aircraft industry, which was taking about 50 per cent of the total material available. Use of cadmium in the aircraft industry is mainly for corrosion-resisting electro-plating. It is interesting to note, therefore, that statistics of cadmium consumption by types of uses in the first half of 1943 showed that more than 90 per cent of the total cadmium consumption in the United States was for electro-plating compared with 62 per cent in 1941. There was thus less than 10 per cent of the total consumption for bearings, pigments, solders and fusible alloys in 1943. The use of cadmium in pigments had been considerably restricted in 1942, and in fact was only allowed for special, mostly military, purposes. Practically all of the cadmium which is in excess of Canada's own requirements was shipped to Europe, and a number of restrictions were placed on the use of cadmium and its alloys, by the Canadian Metals Controller in January, 1943."

Exports of cadmium from Canada in 1943 totalled 572,215 pounds valued at \$626,379 compared with 800,710 pounds worth \$855,618 in 1942.

The price of cadmium in 1943 (in Canadian funds) averaged \$1.15 a pound, compared with \$1.18 in 1942. The price of metallic cadmium, f.o.b. New York, in commercial sticks remained at 90 cents a pound throughout 1942 and 1943. The American product is protected by a duty of 7½ cents a pound. Previous to the Trade Agreement of November, 1938, the duty was 15 cents a pound.

Table 142.—Cadmium Production in Canada, 1936-1943

Year	British Columbia		Manitoba		Saskatchewan	
	Pounds	\$	Pounds	\$	Pounds	\$
1936.....	526,034	468,170	148,133	131,838	111,749	99,457
1937.....	436,431	715,747	164,223	269,326	144,553	237,067
1938.....	510,342	410,090	115,166	92,543	73,630	59,166
1939.....	799,253	553,241	73,830	52,029	66,608	46,939
1940.....	778,791	905,734	57,742	67,154	71,594	83,264
1941.....	1,081,374	1,269,533	61,085	71,714	108,832	127,769
1942.....	972,413	1,147,447	29,236	34,498	147,314	173,831
1943.....	598,673	688,474	20,985	24,130	166,955	191,998

Table 143.—Cadmium Consumed by Specified Canadian Industries, 1939-1943—(Pounds)

Industry	1939	1940	1941	1942	1943
White metal alloys.....	3,115	4,174	6,971	2,259	39,660
Steel foundries.....	1,825	6,000	32,000	18,000	
Iron foundries.....	2,658	9,528	12,000	34,000	
Non-ferrous smelters.....	1,344			2,000	
Other industries.....	73,266	122,317	247,746	337,134	200,000
Total Accounted for.....	82,208	142,019	298,717	413,725	239,660

CALCIUM

There is no commercial production of calcium metal in Canada and data relating to imports of metallic calcium into the Dominion are not published. Calcium metal was imported into the United States from France and Germany prior to the present world war. However, in 1939 a new plant was built for the production of the metal at Sault Ste. Marie, Michigan, by the Electro Metallurgical Company. Metallic calcium is utilized as a scavenger in steel and secondary aluminum, to produce magnesium castings and calcium hydride, and to harden lead. Calcium is used as a deoxidizer and final addition in obtaining particularly clean steels and in imparting better working properties to high nickel-chromium steels. Calcium-silicon (28-35 per cent calcium and 60-65 per cent silicon) and calcium-manganese-silicon are likewise employed for this purpose, although the unalloyed metal may have specific effects. Calcium-bearing alloys are now being made in Canada.

New York quotation for calcium, January, 1944, was \$1.25 per pound, ton lots. Data relating to imports into Canada of calcium are not shown separately in Canadian trade reports.

CHROMITE

Canadian production of chromite during 1943 totalled 29,595 short tons valued at \$919,878 compared with 11,456 short tons worth \$343,568 in 1942. Commercial shipments by primary producers in both years were confined to the Eastern Townships of the province of Quebec. The 1943 annual output was exceeded only by the production of 36,725 tons valued at \$499,682 in 1917.

During the year under review, there were 15 firms engaged in mining or developing chromite deposits in Canada; capital employed by these operators totalled \$1,691,315 and \$569,284 were distributed to 370 employees in salaries and wages. Process supplies, freight, fuel and electricity used amounted to \$189,770 and the net value of production was estimated at \$730,108,

The principal operations in 1943 were those conducted by Chromite Limited near St. Cyr, Quebec and those of the Wartime Metals Project at Chromeraine, near Black Lake, Quebec.

The following information is from a report "Chromite in 1943" as prepared by the Bureau of Mines, Ottawa:

"In Manitoba, large bodies of low-grade chromite deposits were discovered early in 1942 north of Bird River in the southeastern part of the Province. The chromite occurs in alternate narrow bands of high and low-grade ore and various zones have been traced for lengths of several thousand feet. The run-of-mine ore ranges between 15 and 20 per cent Cr_2O_3 , but it is complex and high in iron and an economical method of bringing the chrome-iron ratio to within market requirements has not yet been devised. Many claims have been staked and drilled by Hudson Bay Exploration Company, God's Lake Gold Mines, Gunnar Gold Mines, Central Manitoba Mines, Stanmore Mines, and others. Late in 1943 Hudson Bay Exploration Company formed a subsidiary, Manitoba Chromium, Limited to work the Page claims and although no development is intended in the near future, research on the treatment of the ore is being continued. Diamond drilling is being done by Stanmore Mines, Limited on some recently discovered showings near Maskwa Lake, 16 miles north of Bird River; and Gunnar Gold Mines, Limited is exploring showings at Euclid Lake to the northeast.

"In British Columbia, during 1942 and 1943, a number of chromite deposits were examined by geologists of the Federal and Provincial Departments of Mines. There was no production in this province in 1943 and prospecting for the mineral appears to have ceased.

"Canadian consumption of chromite in 1943 was 131,276 tons, a 29 per cent increase over that of 1942.

"About 48 per cent of the total imports of nearly 112,210 tons came from Africa, mainly from Rhodesia; 29 per cent from India, which included some refractory ore purchased by the Government; and 23 per cent from the United States, mainly from Montana.

"Canadian production of ferrochrome and other chrome addition agents was about 47,000 short tons, an increase of 40 per cent over that of 1942.

"The principal chromite-producing countries are Russia, South Africa, Turkey, Southern Rhodesia, Cuba, New Caledonia, Yugoslavia, India and Philippine Islands.

"Chromium is one of the principal alloying elements in a great variety of steels, chief of which, in the amount of chromium used, are the highly important stainless and corrosion-resistant steels. It is the vital ingredient with nickel and molybdenum in the making of armour plate, armour-piercing projectiles, and high-speed tool steels, and is used as a hard, toughening element in tank axles and frames, in aeroplane parts and in other essential war materials. Chromium is also used in some types of cast iron and in non-ferrous alloys. The ore is usually converted into ferrochrome before being added to the steel bath. Large quantities of chromite with certain specifications as to physical and chemical properties are used in the making of refractories. Chromite is the source of such chemicals as sodium and potassium chromates. It is also used in the electroplating, dyeing, tanning, and paint industries:

"Until recently, metallurgical chromite had to contain a minimum of 48 per cent Cr_2O_3 and a chrome-iron ratio of not less than 3 to 1. Basic ceiling prices are for ores of this grade and ratio, but ores as low as 40 per cent Cr_2O_3 and 2 to 1 ratio are acceptable at lower prices. When possible, lower grade ores are mixed with those of the highest grade, the proportion depending upon whether the ferrochrome produced is to be used for low or for high-carbon steels. The maximum allowance for sulphur is 0.5 per cent and for phosphorus 0.2 per cent. Although lump ores are preferred, fines and concentrates are used in quantity and in some instances they are briquetted before use. The low iron content of the ore or concentrate is of the utmost importance.

"Specifications for refractory ore suitable for bricks depend upon the kind of brick to be made. A Canadian manufacturer indicates maxima allowances of 25 per cent Fe_2O_3 , 18 per cent Al_2O_3 , and 4 per cent SiO_2 . The silica should be as low as possible and it usually occurs in the ore as serpentine, a hydrated magnesium silicate, having a comparatively low melting point. The chromite should be present in an evenly and finely distributed form, not as coarse grains mixed with blobs of the silicate. The ore should be hard and lumpy, and the lumps should be plus 12 mesh. Provided the impurities are within the above specifications, the Cr_2O_3 content may vary within certain limits, but it is generally over 40 per cent.

"Standard grades of ferrochrome contain a minimum of 60 to 70 per cent chromium and are produced in two grades, one being high (4 to 6 per cent) in carbon and the other low (less than 2 per cent).

"The principal Canadian buyers of chromite for metallurgical use are: Chromium Mining and Smelting Corporation, Sault Ste. Marie, Ontario, and Electro-Metallurgical Company of Canada, Welland, Ontario. The only important purchaser of refractory ore is Canadian Refractories Limited, Canada Cement Building, Montreal, Quebec.

"Canadian prices for high-grade ores are based upon the United States ceiling price, which is \$43.50 per long ton at seaboard for ore containing 48 per cent Cr_2O_3 with a chromium-iron ratio of 3 to 1; plus or minus 90 cents per long ton unit of 22.4 pounds of contained Cr_2O_3 above or below 48 per cent; plus or minus \$1.25 for each 0.1 chromium-iron ratio above or below 3 to 1, the limits being 3.5 to 1 and 2 to 1. The price at a Canadian mine at Black Lake in the Eastern Townships of Quebec would, for example, approximate to this basic ceiling price; plus freight of \$2.28 from seaboard to Niagara Falls (near a Canadian consuming centre); plus exchange at 11 per cent to convert into Canadian funds; less \$5.12 freight from Black Lake to Niagara Falls. For a 46 per cent Cr_2O_3 ore with Cr-Fe ratio of 2.8 to 1, this price per long ton at Black Lake would thus amount to about \$43.50, less penalties of \$4.30, plus freight of \$2.28, plus \$4.56 exchange, less \$5.12 freight, or to about \$40.83 in Canadian funds; a 48 per cent ore would be about \$42 a long ton. Prices of other grade ores can be obtained from the Metals Controller, Ottawa.

"United States prices of ferrochrome delivered on contracts are as follows: high-carbon ferrochrome, 66 to 70 per cent chromium and 4 to 6 per cent carbon, 13 to 14 cents a pound; and low-carbon ferrochrome, 67 to 72 per cent chromium and 2 per cent carbon, 19½ cents, and 0.1 per cent carbon, 22½ cents a pound of contained chromium."

Table 144.—Production of Chromite in Canada, 1928-1943

Year	Short tons	\$	Year	Short tons	\$
1928.....			1936.....	(x)	13,578
1929.....	126	900	1937.....	(x)	43,250
1930.....			1938.....		
1931.....			1939.....		
1932.....	78	1,113	1940.....	335	5,780
1933.....	30	343	1941.....	2,372	42,679
1934.....	111	1,578	1942.....	11,456	343,568
1935.....	1,144	14,947	1943.....	29,595	919,878

(x) Quantity not published.

Table 145.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1942 and 1943

Industry	Item	1942		1943	
		Pounds	\$	Pounds	\$
Ingots and castings.....	Chrome ore.....	2,464,000	58,095	2,738,000	63,838
Ingots and castings.....	Ferrochrome.....	11,262,000	1,445,089	12,994,000	1,417,215
Paints, pigments and varnishes.....	Chrome colours.....	2,669,978	551,855	2,563,058	535,527
Paints, pigments and varnishes.....	Sodium bichromate.....	1,015,065	105,731	941,456	95,805
Leather tanning.....	Sodium bichromate.....	2,107,737	203,305	2,114,862	211,913
Glass manufacture.....	Chromite.....	16,000	460	12,000	432

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. Chromite is also employed in Canada in the manufacture of refractories.

Table 146.—Chromite Mining in Canada, 1942 and 1943
(all in Province of Quebec)

		1942	1943
Active firms.....	No.	14	15
Capital employed.....	\$	380,027	1,691,315
Employees—Salaried.....	No.	45	48
Wage-earners.....	No.	286	322
Total.....	No.	331	370
Salaries and wages—			
Salaries.....	\$	57,926	108,674
Wages.....	\$	354,529	460,610
Total.....	\$	412,455	569,284
Gross value of production.....	\$	343,568	919,878
Fuel and electricity used.....	\$	34,567	75,806
Process supplies used.....	\$	116,725	75,995
Freight.....	\$	17,945	37,969
Net value.....	\$	174,331	730,108

NOTE.—In addition, exploratory work, including diamond drilling, was conducted in 1942 on chromite deposits located in south-eastern Manitoba, but no data are available.

INDIUM

Indium was commercially recovered in Canada only in 1942 when 470 troy ounces valued at \$4,710 were produced at Trail, British Columbia by the Consolidated Mining and Smelting Company of Canada Limited. The metal was obtained in the treatment of zinc refinery residues. The United States produces a considerable quantity of indium but data relating to entire world production are not available. Indium is used for plating and as an alloy with other metals. The Bureau of Mines, Ottawa, reports that the augmented production of engine gears and war restrictions on ordinary plating metals have stimulated interest in indium during the past three years. "E and M J Metal Markets", New York, August, 1944, quoted indium at \$7.50 per troy ounce 99.9 per cent pure.

IRON ORE

Production of iron ore in Canada during 1943 totalled 641,294 short tons valued at \$2,032,240 compared with 545,306 short tons worth \$1,517,077 in 1942. Of the 1943 output, 143,062 tons came from a property near Bathurst, New Brunswick and 498,232 tons from deposits in the province of Ontario. The number of firms engaged in the development, exploration or mining of Canadian iron ore deposits totalled 14 in 1943; capital employed amounted to \$7,570,964; fuel, electricity and process supplies consumed and freight paid aggregated \$982,282, and the net value of production was estimated at \$1,049,958.

A report on "Iron Ore in 1943", as prepared by the Bureau of Mines, Ottawa, contains the following information:

"Deposits of iron ore in Canada are many and widespread and include hematite, siderite, magnetite, bog iron, and magnetic sand. Because of the availability of low cost, higher grade ores in the Lake Superior iron ranges of the United States and in Newfoundland, no iron ore from domestic sources was produced in Canada from 1923 until 1939.

"Dominion Steel and Coal Corporation, Limited, with plants at Sydney, Nova Scotia, obtained its iron ore in 1943 chiefly from its own mines at Wabana, Newfoundland. Steel Company of Canada, Limited, at Hamilton, Ontario, and Canadian Furnace, Limited, at Port Colborne, Ontario obtain their iron ore supplies from the Lake Superior region of the United States. Algoma Steel Corporation obtains most of its requirements from the United States and the remainder from the New Helen mine, Michipicoten area.

"In Ontario, Algoma Ore Properties, Limited, a wholly owned subsidiary of Algoma Steel Corporation, Limited, began in 1937 development work at its New Helen mine in the Michipicoten area, Ontario, and the first sinter was produced in July, 1939. Operations during the past

three years consisted mainly in open-cut mining. The New Helen deposit is estimated by the company to contain at least 100,000,000 tons of siderite or carbonate ore, averaging about 35 per cent iron, and, to fit it for commercial use in blast furnaces, a sintering plant capable of treating 3,000 tons of ore a day was built, the sinter produced approximating 53.4 per cent iron, 7.0 per cent silica, 0.04 per cent sulphur, and 3.0 per cent manganese. The sintered ore is shipped from Michipicoten Harbour, 8 miles from the sintering plant, partly to the company's blast furnaces at Sault Ste. Marie, Ontario, and partly to United States ports on the Lower Lakes for use in United States blast furnaces. The manganese content is of special interest to users.

"Exploratory work on the hematite property of Steep Rock Iron Mines, Limited, situated near Atikokan, and about 135 miles west of Port Arthur, indicated that the deposits, which were discovered in the winter of 1937-38 under the bed of Steep Rock Lake by diamond drilling through the ice, were large and high in grade. The size of the hematite bodies can be gauged from what has been reported, namely, that the probable average widths of A, B, and C bodies are 205, 135, and 200 feet respectively, with explored lengths of over 3,000 feet in the case of A which is still open at one end, and of 5,000 and 800 feet for B and C, each of which is open at both ends. Under the A orebody the greatest depth at which the ore has been found in a borehole is 1,400 feet below the surface of Steep Rock Lake, or 1,035 feet below the ledge; under the B zone ore was encountered 700 feet below lake level. High-grade ore occurs within these deposits and presumably makes up a considerable, but as yet very incompletely defined part of them. The company reports that the property has "proven ore" totalling 17,244,000 long tons and "probable ore" 14,336,000 long tons, making a total of 31,580,000 long tons, and assuring production for a number of years to come. Most of this ore is available for open pit mining. No estimate has been prepared of "possible ore".

"Iron ore properties located in the Atikokan area were also explored in 1943 by the Great Lakes Iron Mines Limited, Midwest Iron Corporation Limited and Rebar Gold Mines Ltd. Gunflint Iron Mines Limited conducted exploratory work in Ontario on iron deposits located at Round Lake on the Gunflint Iron Range and at Shebandowan on the Mattawin iron range.

"At the Josephine mine of Michipicoten Iron Mines Ltd., underground development was carried on continuously throughout 1943. This work was mainly confined to the three lowest levels, the fourth, fifth and sixth levels, the greatest amount being done on the sixth level where a length of over 1,200 feet of continuous ore was opened up, with ore still showing at one end. Surface diamond drilling indicates that this length (1,200 feet) will ultimately be doubled. As a result of this development the tonnage of ore reserves was more than doubled during the year and the grade of ore was appreciably improved. The reserves are estimated to total 2,666,000 long tons of hematite assaying (dry analysis) 53.94 per cent iron, 15.67 per cent silica, and 1.18 per cent sulphur.

"The Ruth property, which is two miles from the Josephine and owned by the same company, was drilled extensively during 1942 and during the first three months of 1943. The indicated ore reserves to a depth of 800 feet are 28,600,000 long tons of siderite averaging 31.26 per cent iron, 13.15 per cent silica and 5.14 per cent sulphur. These reserves include 16,840,000 tons of low silica siderite averaging 34.54 per cent iron and 6.81 per cent silica. The remainder (11,760,000 tons) is high silica siderite and averages 26.57 per cent iron and 21.46 per cent silica. A pilot plant has been in operation since the summer of 1942 for testing purposes.

"The Frobisher Exploration Company, Ltd., an exploration subsidiary of Ventures Limited and associated companies, investigated in 1941 and 1942 certain magnetite deposits in Mayo township, Hastings county.

"Tomahawk Iron Mines Ltd. has been developing a property on Whetstone Lake, Lake township, Hastings county, eastern Ontario. The company reports estimated ore reserves of 500,000 tons of 60 per cent magnetite, above the 300-foot level. Test shipments have been made to steel plants in southern Ontario, and a truck road to the property is being built.

"Hollinger Consolidated Gold Mines Ltd., under an agreement with Beverly Iron Prospecting Syndicate, did some exploration in 1943 on the Beverly iron ore holdings near Milton, Halton county, Ontario. From 1940 to 1942 the Syndicate made extensive dip-needal surveys followed by detailed magnetometer surveyings. In the spring of 1943 drilling to a depth of 3,000 feet was undertaken and an electric survey made by Hollinger. The option was afterwards surrendered.

"Extensive surveys and exploration work have been carried on since 1936 by Labrador Mining and Exploration Company of Montreal, near Sawyer Lake and vicinity, along the Quebec-Labrador boundary line. Important iron ore deposits are indicated on the concession held by this company.

"Hollinger North Shore Exploration Company, a subsidiary of Hollinger Consolidated Gold Mines, was engaged in exploring an area in Quebec, immediately north of the Labrador concession and covering an area of 3,900 square miles. Many indications of iron-ore deposits were encountered, and the area on which non-ferrous minerals might be expected was also investigated. Hollinger has completed negotiations with M. A. Hanna Company of Cleveland, Ohio, for their participation in the future exploration and developments of the iron deposits in both areas. The exploitation of these deposits would necessitate the construction of a railway line from the St. Lawrence River at Seven Islands, which port is open to navigation throughout the year.

"The iron ore mining operations conducted during 1942 and 1943 at Bathurst, New Brunswick, by the Dominion Steel and Coal Corporation Limited were closed down indefinitely on November 25, 1943; the plant was dismantled and removed elsewhere.

"Bounties on the production of iron ore are offered by the provinces of Quebec, Ontario, and British Columbia. In Quebec, the premium is at the rate of four-fifths of one cent for each unit (22 lbs.) of iron metal contained in every ton of iron ore. In Ontario, the bounty is 2 cents per unit of metallic iron in the long ton of low-grade iron ore beneficiated in Ontario so as to be suitable for use in the blast furnace, or on natural ore of commercial quality smelted in Canada. In British Columbia, the bounty paid must not exceed \$3.00 a ton on the proportion of pig iron produced from ore mined in the province, and must not exceed \$1.50 a short ton on the proportion of pig iron produced from ore mined outside the province. A bounty not to exceed \$1.00 a short ton is also offered on steel shapes of commercial utility manufactured in British Columbia.

"There are no official Canadian price quotations for iron ore. Prices f.o.b. Lake Erie ports, per long ton for Lake Superior, U.S.A., iron ore, 51½ per cent iron ore are: Messabi, Non-Bessemer—\$4.45, Bessemer—\$4.60, Old Range, Non-Bessemer—\$4.60; Bessemer—\$4.75. The price of Brazilian ore, f.a.s. Brazilian ports, 68 per cent iron, is 7 cents per long ton unit or \$4.76 a long ton."

Complete data on world production of iron ores have not been available since the commencement of the present world war.

Table 147.—Production of Iron Ore(x) in Canada, 1939-1943

Year	Short tons	Value
1939.....	123,598	341,594
1940.....	414,603	1,211,305
1941.....	516,037	1,426,037
1942.....	545,306	1,517,077
1943.....	641,294	2,032,240

(x) Exclusive of titanium-bearing iron ores and all from Ontario with the exception of 187 tons from Quebec in 1942 and 143,062 tons from New Brunswick in 1943.

Table 148.—Imports and Exports of Iron Ore, 1942 and 1943

	1942		1943	
	Short tons	\$	Short tons	\$
Imports.....	2,701,968	6,230,197	3,906,425	8,057,382
Exports.....	295,960	1,055,861	374,677	1,450,985

Table 149.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1931-1943

Year	To Nova Scotia	To United States	To Europe	Total Ship- ments
	(Short tons)			
1931	234,148	25,670	530,079	789,897
1932*			166,303	166,303
1933			254,383	254,383
1934*	346,178		344,769	690,947
1935	611,581		81,123	692,704
1936	527,540	12,656	252,676	792,872
1937	702,714	50,490	1,242,088	1,995,292
1938	555,348		1,305,068	1,860,416
1939	576,198	16,184	980,098	1,572,480
1940	762,310	26,118	789,578	1,578,006
1941	943,643	63,869	316,530	1,324,042
1942	†735,324		234,483	969,807
1943	*903,414		2,688	906,102

* Shipments to Europe in 1930, 1932 and 1934 were to Germany only, while from 1935 to 1938 shipments went to both Germany and Great Britain. Shipments to Germany in 1938 totalled 1,256,230 short tons, and in 1939, 768,743 tons. In 1940 and following years, European shipments went to Great Britain.

† Includes 41,203 tons lost by enemy action in 1942 and 5,969 in 1943.

Table 150.—Iron Ore Mining in Canada, 1942 and 1943(*)

	1942			1943		
	Quebec	Ontario	Canada	Quebec†	Ontario	Canada
Active firms.....No.	3	4	7	5	9	14
Capital.....\$	105,927	2,402,723	2,508,650	4,897	7,566,067	7,570,964
Employees—On salary.....No.	7	35	42	1	98	99
Wage-earners.....No.	5	313	318	9	395	404
Total.....No.	12	348	360	10	493	503
Salaries and Wages—Salaries.....\$	3,699	89,785	93,484	100	205,757	205,857
Wages.....\$	5,140	577,495	582,635	10,585	1,218,513	1,229,098
Total.....\$	8,839	667,280	676,119	10,685	1,424,270	1,434,955
Gross value of production.....\$	935	1,516,142	1,517,077	579,990	1,452,250	2,032,240
Fuel and electricity.....\$		301,778	301,778	569	362,785	363,354
Process supplies used.....\$		347,690	347,690	34	336,881	336,915
Freight.....\$		236,307	236,307		222,013	222,013
Net value.....\$	935	630,367	631,302	579,387	470,571	1,049,958

* Does not include data relating to titaniferous iron ores.

† Includes 1 producer in New Brunswick for which complete data are not available; no production in Quebec.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Statistics for the Primary Iron and Steel Industry include data for all establishments in Canada which were engaged chiefly in the manufacture of (a) pig iron, (b) ferro-alloys, (c) steel ingots and steel castings, (d) hot rolled iron and steel products, (e) cold rolled or cold drawn steel bars, strips and shapes. Forty-six firms were included in this industry in 1943 and reports were received for 63 different plants or departments, including 4 blast furnace departments, 4 ferro-alloy plants, 37 steel furnace divisions, and 18 rolling or drawing mills. Separate reports were received for blast furnace departments, for steel furnace divisions and for rolling mills even when all three were units of a single works.

Factory sales of pig iron, ferro-alloys, steel ingots and castings and finished rolled products were 3.6 per cent lower in 1943 than in 1942, the values being \$223,951,059 and \$232,105,755 respectively. Twenty-seven works in Ontario accounted for 71 per cent of the total for Canada or \$159,789,576; 6 plants in Nova Scotia accounted for 11 per cent or \$23,931,519; 16 plants in Quebec for 14 per cent or \$32,341,735, while the remaining \$7,888,229 or 3 per cent was accounted for by 4 plants in Manitoba, 7 in British Columbia and 3 in Alberta.

Fixed and working capital employed in this industry amounted to \$235,386,238, including \$149,293,756 for the value of land, buildings and plant equipment; \$47,998,199 for the value of raw and finished materials on hand and in process, and \$38,094,283 for operating capital,

such as cash, bills and accounts receivable. For works in Ontario, the capital was \$145,658,861; in Nova Scotia, \$49,399,083; in Quebec, \$36,242,566; in Manitoba, \$2,516,811 and in Alberta and British Columbia, \$1,568,917.

In 1943 an average of 34,222 people were employed in this industry, this being an increase of 3 per cent over the 1942 average of 33,245. About 1,637 persons worked in the blast furnace departments during the year, 13,095 in the steel furnaces, 16,942 in the rolling mills and 2,548 in ferro-alloy plants (exclusive of those producing ferro-alloys as a by-product). Fifty-six per cent of the employees or 19,127 worked in plants in Ontario, 6,482 in Quebec, 6,899 in Nova Scotia, 959 in Manitoba and 755 in Alberta and British Columbia.

Payments in salaries and wages during 1943 amounted to \$65,654,468, a gain of 8 per cent over the previous year's total of \$60,874,818. Salaries advanced to \$6,263,581 from \$5,283,722 and wages to \$59,390,887 from \$55,591,096.

Materials used in manufacturing processes cost \$101,413,794 in 1943 compared with \$110,551,516 in 1942, and the cost of fuel and electricity was \$18,985,135 against \$18,734,178, a decreased expenditure of 8 per cent for materials and an increase of 1 per cent for fuel and powers.

Pig Iron.—Output of 1,758,269 net tons of pig iron in 1943 was 11 per cent under the 1,975,014 tons reported for the previous year. Production of basic iron amounted to 1,456,549 tons or 83 per cent of the total; foundry iron amounted to 148,653 tons and malleable iron to 153,067 tons.

Producers' sales of pig iron totalled 387,109 tons at \$8,328,322 in 1943 compared with 387,997 tons at \$8,366,936 in 1942.

Charges to iron blast furnaces during the year included 2,955,671 tons of imported iron ore, 302,780 tons of Canadian ore, 1,646,191 tons of coke, 321,441 tons of imported limestone and 464,497 tons of Canadian limestone.

Imports of pig iron during the calendar year increased to 7,118 tons from 1,536 tons in 1942 and exports increased slightly to 438 tons from 427 tons.

Producers' stocks at the end of 1943 totalled 28,230 tons compared with 87,955 tons at the end of the previous year.

The apparent consumption of pig iron in Canada, as calculated by deducting the exports from the sum of the production and imports, and allowing for changes in producers' stocks, amounted to 1,824,674 tons in 1943 or 5 per cent less than in 1942 when the apparent domestic supply was 1,915,217 tons.

Producers of pig iron in Canada had 14 blast furnaces at the end of 1943 which could produce 2.7 million net tons a year if operated at rated capacity. Actual production of 1,758,269 net tons in 1943 showed an operating rate of about 64 per cent. Fourteen furnaces were in blast during the year.

Ferro-alloys.—Ferro-alloys were made in 1943 by 10 different concerns, 5 of which recovered ferrosilicon as a by-product in the manufacture of abrasives. Output of ferro-alloys in 1943 amounted to 197,094 net tons, a decrease of 6 per cent over the 209,017 tons reported for 1942.

Altogether, ferrosilicon was made in nine different plants, spiegeleisen in two and ferrochrome in two. Other alloys produced by one firm only included ferromanganese, silicospiegel, silicomanganese, silicon metal, calcium silicon, calcium manganese silicon, and ferrophosphorus.

Steel Ingots and Castings. Steel production declined 3 per cent to 3,004,124 tons in 1943 from 3,109,851 tons in 1942, the output of steel ingots to 2,846,736 tons from 2,958,906 tons and steel castings to 157,388 tons from 150,945 tons. Factory sales of ingots and castings totalled 151,924 tons at \$30,057,984.

Thirty-seven steel plants were in operation during the year. At the end of 1943 these plants had 137 furnaces, including 51 basic open hearth with an annual capacity of 2,825,400 net tons, 85 electric furnaces rated at 786,000 tons, and 3 converters at 8,000 tons. There were just 12 makers of steel ingots with capacity of 3,395,900 net tons per annum. The total annual steel capacity of all plants, including ingots and castings, was 3,619,400 tons at the year end.

Operating steel furnaces in 1943 used 1,518,518 net tons of pig iron, 1,751,779 tons of scrap iron or steel, 171,040 tons of ores, 242,032 tons of limestone, 89,056 tons of dolomite, 65,856 tons of lime, 95,605 tons of silica sand, 19,427 tons of magnesite and 19,800 tons of ferro-alloys.

Rolled and Drawn Steel.—In 1943 there were 15 mills occupied chiefly in hot rolling of steel products and 3 mills making only cold drawn and cold rolled shapes. Ten of these mills were in Ontario, 3 in Nova Scotia, 3 in Quebec, 1 in Manitoba and 1 in Alberta.

Rolling mill sales advanced 0.1 per cent to \$158,138,483 from \$157,973,974 in 1942. The main items sold during the year under review were: 489,379 tons of hot rolled bars at \$43,233,796; 391,202 tons of plates at \$27,919,833; 213,908 tons of sheets, hoops, bands and strips at \$17,257,901; 303,094 tons of rails and rail fastenings at \$14,798,762; 279,492 tons of semi-finished rolled forms, such as blooms, billets, etc., at \$13,906,485; 151,674 tons of structural shapes at \$8,802,273 and 88,848 tons of wire rods at \$3,621,273.

Table 151.—Provincial Distribution of Active Plants in the Primary Iron and Steel Industry, 1943

Province	Number of firms	Pig iron		Steel ingots and castings		Rolling and drawing mills	Ferro-alloys (a)
		Number of plants	Number of blast furnaces	Number of plants	Number of steel furnaces		
Nova Scotia.....	4	1	4	2	17	3	
Quebec.....	15			12	28	3	1
Ontario.....	16	3	10	11	72	10	3
Manitoba.....	3			3	5	1	
Alberta.....	2			2	3	1	
British Columbia.....	7			7	12		
Canada.....	(b) 46	4	14	37	137	18	4

(a) Not including artificial abrasive plants which made ferrosilicon as a by-product.

(b) Some firms operate in more than one province.

Table 152.—Principal Statistics of the Primary Iron and Steel Industry, 1943

Year	Number of plants	Capital employed	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
		\$		\$	\$	\$	\$
Nova Scotia.....	6	49,399,083	6,899	11,176,181	2,189,508	12,199,604	23,931,519
Quebec.....	16	36,242,566	6,482	12,299,476	3,460,979	12,534,428	32,341,735
Ontario.....	27	145,658,861	19,127	39,265,015	12,724,046	74,591,373	159,789,576
Manitoba.....	4	2,516,811	959	1,499,389	435,069	1,313,557	4,154,981
Alberta.....	3	875,751	330	522,535	78,927	407,118	1,471,116
British Columbia.....	7	693,166	425	891,872	96,606	367,714	2,262,132
Canada.....	63	235,386,235	34,222	65,654,468	18,985,135	101,413,794	223,951,059
Per cent change 1943 from 1942.....		+14.4	+2.9	+7.9	+1.3	-9.0	-3.6

NOTE.—Profits or losses cannot be calculated from above figures as data are not available for general expense items, such as interest, rent, depreciation, taxes, insurance, advertising, etc.

Table 153.—Production of Pig Iron and Sale by the Producers, 1942 and 1943

Grade	Delivered in molten condition	Machine cast	Total tonnage made	Sales	
				Quantity	Income from sales
	Net tons	Net tons	Net tons	Net tons	\$
1942					
Basic.....	1,487,581	158,420	1,646,001	67,242	1,307,715
Foundry.....		159,724	159,724	157,991	3,439,405
Malleable.....		169,289	169,289	162,764	3,619,816
Total.....	1,487,581	487,433	1,975,014	387,997	8,366,936
1943					
Basic.....	1,338,913	117,636	1,456,549	84,575	1,697,774
Foundry.....		148,633	148,633	145,713	3,128,780
Malleable.....		153,067	153,067	156,821	3,501,798
Total.....	1,338,913	419,356	1,758,269	387,109	8,328,322

NOTE.—Silvery pig iron has been included with ferro-alloys.

Table 154.—Materials Charged to Iron Blast Furnaces, 1942 and 1943

Material	1942		1943	
	Quantity	Cost at furnace	Quantity	Cost at furnace
	Net tons	\$	Net tons	\$
Iron ore—Imported (crude).....	3,383,439	13,726,346	2,955,671	12,247,784
Canadian (beneficiated).....	229,253	798,974	198,244	737,276
Canadian (crude).....			104,536	460,160
Mill cinder, roll scale, flue dust, etc.....	177,343	386,730	125,477	315,483
Scrap (net charge).....	64,624	803,172	43,032	543,930
Limestone—				
From Canadian quarries.....	301,143	447,107	464,497	867,146
From foreign sources.....	559,650	799,302	321,441	362,195
Dolomite.....			32,064	71,945
Coke.....	1,795,875	13,402,828	1,646,191	13,989,052
Other materials.....		163,675		315,061
Total.....		30,528,134		29,910,032

Table 155.—Imports Into Canada and Exports of Pig Iron, 1933-1943

Year	Imports		Exports	
	Net tons	\$	Net tons	\$
1933.....	2,754	43,298	13,331	214,195
1934.....	7,189	108,300	10,327	176,093
1935.....	9,990	143,726	15,410	287,896
1936.....	4,435	74,589	15,572	304,682
1937.....	7,135	144,354	43,138	851,701
1938.....	2,377	62,494	11,811	224,261
1939.....	657	15,176	12,015	221,787
1940.....	29,703	672,489	4,113	101,126
1941.....	4,729	131,112	380	10,090
1942.....	1,536	42,718	427	12,175
1943.....	7,118	173,598	438	11,163

Table 156.—Blast Furnaces in Canada, 1941-1943

Name of Company	Location of Plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast		
				1941	1942	1943
Dominion Steel and Coal Corporation, Ltd.	Sydney, N.S.....		Net tons			
		1	616			180
		1	616	365	365	358
		1	392	365	365	16
		1	336	298	365	326
Total.....		4	1,960			
Canadian Furnace Company, Limited.	Port Colborne, Ont.	1	466	279x	304x	196x
		1	147		289	332
Total.....		2	613			
The Steel Company of Canada, Limited.	Hamilton, Ont.	1	364	365	365	347
		1	728	365	365	365
		1	980	110	365	365
Total.....		3	2,072			
Algoma Steel Corporation, Ltd.	Sault Ste. Marie, Ont.	1	336	365	360	317
		1	336		184	277
		1	616	262	349	346
		1	504	365	361	346
		1	1,120			32
Total.....		5	2,912			
Total for Canada.....		14	7,557			

(x) For making pig iron; ferro-alloys also made in this furnace.

Table 157.—Production of Ferro-Alloys, 1933-1943

Year	Net tons	Year	Net tons
1933.....	33,749	1939.....	85,540
1934.....	35,751	1940.....	149,394
1935.....	63,410	1941.....	204,354
1936.....	85,438	1942.....	209,017
1937.....	91,921	1943.....	197,094
1938.....	62,637		

Table 158.—Production of Steel Ingots and Steel Castings, by Grades, 1939-1943
(Net tons)

Year	Steel ingots		Steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Con- verter	Electric	
1939.....	1,410,339	79,718	17,473	934	42,590	1,551,054
1940.....	2,041,947	135,633	21,085	2,268	52,786	2,253,769
1941.....	2,394,098	199,414	29,401	3,371	85,867	2,712,151
1942.....	2,623,853	335,053	26,627	6,515	117,803	3,109,851
1943.....	2,484,544	362,192	28,895	4,003	124,490	3,004,124

Table 159.—Materials Used in Steel Furnaces, 1942 and 1943

Material	1942		1943	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Net tons	\$	Net tons	\$
Pig iron—Own make.....	1,525,853		1,435,020	
Purchased.....	89,543	2,039,095	83,523	1,873,372
Scrap iron or steel—Own make.....	864,537		947,633	
Purchased.....	962,374	21,377,022	804,096	17,554,265
Spiegeleisen.....	2,911	153,054	367	31,474
Silicospiegeleisen.....	439	51,827		
Ferromanganese.....	19,190	2,484,783	19,096	2,356,754
Silicomanganese.....	8,065	918,774	9,568	1,094,239
Ferrosilicon.....	12,150	841,900	11,545	757,911
Ferrochrome—High carbon.....	3,666	724,819	4,669	702,817
Low carbon.....	1,965	720,270	1,828	714,398
Ferromolybdenum.....	150	223,233		280,813
Ferrophosphorus.....	290	25,826	380	33,967
Ferroselenium.....	5	10,323	2	5,793
Ferrotitanium.....	439	66,555	614	118,416
Ferrotungsten.....	646	1,440,141	550	1,721,967
Ferrovandium.....	203	524,007	204	558,717
Ferrozirconium.....	51	7,337	8	2,153
Calcium silicon.....	421	135,680	515	166,923
Calcium manganese silicon.....	289	93,191	215	70,914
Other ferro-alloys.....	134	238,301		35,761
Aluminium ingot and shot.....	807	285,025	951	344,785
Copper ingots.....	39	10,190	37	8,467
Nickel.....	3,392	2,025,604	2,775	1,867,729
Other metals.....		132,736		141,285
Ore, iron, crude.....	98,986	616,617	107,619	671,079
Ore, iron, calcined, roasted or treated.....	98,156	1,757,431	62,052	668,843
Ore, manganese.....	32	1,600		
Ore, chrome.....	1,232	58,095	1,369	63,838
Bentonite.....	3,382	101,211	3,853	97,975
Coal, anthracite.....	755	8,055	1,195	9,475
bituminous.....	219	1,916	133	1,264
Coke—Own make.....	706			
Purchased.....	6,113	74,555	5,158	60,770
Charcoal.....	224	10,333		7,457
Dolomite, Crude.....	79,091	225,393	78,746	243,793
Calcined.....	22,550	179,427	10,310	99,740
Fluorspar.....	20,133	562,480	20,790	715,991
Lime—Own make.....	36,226		29,776	
Purchased.....	23,075	315,470	36,080	344,488
Limestone—Canadian.....	120,573	239,838	125,058	242,328
Imported.....	123,035	128,605	116,974	136,371
Magnesite.....	20,665	786,321	19,427	744,716
Electrodes.....		989,222		1,075,799
Silica sand.....	99,384	712,516	95,605	703,167
Other foundry sand.....	35,340	105,042		154,707
Firebrick, fireclay and other refractories.....		2,469,239		2,634,711
Calcium molybdate and molybdenum oxide briquettes.....	1,145	1,167,579	522	813,861
All other materials.....		3,570,856		3,323,942
Total Value of Metals, Ores and Other Materials Used.....		48,611,494		43,257,235

Table 160.—Summary of Steel Furnace Capacity, December 31, 1943

	Number furnaces	Total annual capacity (net tons)
Basic open hearth.....	51	2,825,400
Electric.....	83	780,000
Converter.....	3	8,000
Total.....	137	3,619,400
Steel ingots—Basic open hearth.....		2,813,400
Electric.....		492,500
Total.....		3,305,900
Steel castings.....		313,500
Total Ingots and Castings.....		3,619,400

LITHIUM

The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminum; spodumene, a silicate of these two elements, and lepidolite, or lithia mica, also a silicate. The lithia content of these minerals, as mined, commonly ranges around 8 to 9 per cent for amblygonite, 4 to 7 per cent for spodumene, and 3 to 5 per cent for lepidolite. All of the above minerals are known to occur in Canada but there has, as yet, been only a small production, mainly of lepidolite and spodumene. The important known deposits of economic interest are all in Manitoba. The first commercial shipment of Canadian lithium ore to be officially recorded was reported during 1937. This production came from deposits located at Bernie Lake, Manitoba, and was valued at \$1,694; the mineral was consigned to the United States for the manufacture of lithium compounds and possible lithium metal. No commercial shipments of lithium ores from Canadian mines were reported since 1937.

In 1942 Sherritt Gordon Mines Limited conducted an exploration by diamond drill of a spodumene-bearing pegmatite on the east shore of Crowduck Bay, Herb Lake, Manitoba; encouraging results were reported from this undertaking.

Prospecting in the Cat Lake area of Manitoba during 1943 disclosed extensive surface showings of spodumene pegmatite over considerable distances beyond the previously known Irgon deposit, with estimated contents of 25 to 30 per cent spodumene over widths of 25 to 30 feet in many sections; the discoveries were under option to the Hudson Bay Mining and Smelting Company Limited.

The principal uses of the lithium ores and salts have been in ceramics, glassware, air conditioning and pharmaceuticals. The United States Bureau of Mines reported that the use of lithium for high-conductivity copper castings more than doubled in the United States in 1941 compared with 1940, and its use in special bronzes is now on a commercial scale. The element is added either in the form of a 50-50 lithium-calcium alloy or as an alloy of 98 per cent copper and 2 per cent lithium.

"E and M J Metal and Mineral Markets", New York, quoted lithium metal, August, 1944, at \$15 per pound 98 to 99 per cent in 100 pound lots. Spodumene—per unit LiO_2 contained \$5 to \$6 on a 6 per cent grade, carlots, North Carolina—nominal.

Data relating to imports of lithium or lithium compounds are not shown separately in Canadian trade reports, also statistics on world production of lithium minerals are not available at present; however, the United States and southwest Africa are the two principal producers of lithium minerals.

MAGNESIUM

Production of magnesium metal in Canada during 1943 totalled 7,153,974 pounds valued at \$2,074,652 compared with 808,718 pounds worth \$355,836 in 1942. The metal in 1943 was produced entirely by Dominion Magnesium Limited in its plant located at Haley, Ontario; recovery was made from Ontario dolomite and the ferrosilicon process was employed. In addition to extracting magnesium from Ontario dolomite in 1942, there was a recovery of the metal at Haley in that year, from brucite produced at Wakefield, Quebec and at Trail, British Columbia from magnesite mined in that province. The extraction of magnesia from sea water is being done on a very large scale in England and the United States, the material so obtained being used for making magnesium metal as well as for various industrial and pharmaceutical purposes.

The United States Bureau of Mines reported that production of primary magnesium in the United States during 1943 totalled 183,584 short tons compared with 48,963 short tons in 1942; companies using electrolytic processes for producing magnesium accounted for over 85 per cent of the total output, and the ferrosilicon and carbothermic processes accounted for the remaining 15 per cent. Of the primary magnesium shipped in 1943 (170,267 tons), approximately 64 per cent was used in the manufacture of magnesium-base alloy structural products; 8 per cent in other alloys, chiefly aluminum; 7 per cent in powder; and 21 per cent for export account (includes 20,911 tons of magnesium-base alloy). Of the magnesium-alloy structural products sold or used, the aircraft industry took 50 per cent, incendiary bomb casings 50 per cent and other industries less than 1 per cent.

According to the United States Bureau of Mines, the world production of magnesium in 1943 reached another all-time high mark of more than 269,000 metric tons—92 per cent more than the previous record of 140,000 tons set in 1942, and more than eight times the 1939 output. On the basis of estimates, it is thought that about 28 per cent of the output was under axis control and 72 per cent under control of the United Nations. Production in 1944 will not greatly exceed that of 1943, inasmuch as all the major expansion programs of the various nations are thought to be virtually complete.

"E and M J Metal and Mineral Markets", New York, quoted magnesium metal, September, 1944: Per pound, ingots (4 x 16 inches), 99.8 per cent, carload lots 20½ cents; 100 pounds or more l.c.l., 22½ cents. Extruded sticks, carload lots 27½ cents; 100 pounds or more l.c.l. 29½ cents. Data relating to Canadian imports and exports of magnesium metal are not shown separately in Canadian trade reports. Imports of magnesium oxide into Canada in 1943 totalled 1,900,513 pounds valued at \$180,039 compared with 1,393,965 pounds appraised at \$90,613 in 1942.

Table 161.—Production of Primary Magnesium Metal in Canada, 1916-1943

Year	Quebec		Ontario		British Columbia		Canada	
	Pounds	\$	Pounds	\$	Pounds	\$	Pounds	\$
1916-1918.....	(a)	(a)	.....	.....	(b) 200,000	(b)	.....	.....
1941.....	.....	.....	.....	.....	(c) 10,905	2,944	10,905	2,944
1942.....	(d) 141,081	62,076	473,910	208,520	193,727	85,240	808,718	355,836
1943.....	.....	.....	7,153,974	2,074,652	.....	.....	7,153,974	2,074,652

(a) Magnesium metal produced in 1918 at Shawinigan Falls, Quebec by Shawinigan Electric Metals Company Limited from imported magnesium chloride but data not available.

(b) Approximately 200,000 pounds produced at Trail from imported magnesium chloride; complete data not available.

(c) Powder.

(d) Produced in Ontario from Quebec brucite.

Table 162.—Consumption of Magnesium Ingots in Canada, 1939-1943

	1939	1940	1941	1942	1943
	(pounds)				
In non-ferrous smelters.....	31,990	192,000	825,717	1,072,346	1,298,650
In white metal alloy foundries.....	774	7,770	9,515	9,850	16,821
In brass and bronze foundries.....	16	163	42,821	44,553	132,465
In aluminum products.....		240	127		89,523
In ammunition.....		404			
In pharmaceuticals.....	200				
Total accounted for.....	32,980	200,577	878,150	1,126,749	1,537,459

MANGANESE

Canadian mine shipments of manganese ore in 1943 totalled only 48 short tons valued at \$985 compared with 435 tons worth \$8,932 in 1942. The 1943 output represents concentrates shipped by British Manganese Mines Limited from its mine and concentrator located at Jordan Mountain, near Sussex, New Brunswick. The following information is taken from a report "Manganese in 1943" as prepared by the Bureau of Mines, Ottawa:

"The manganese ores that have been mined in Canada are pyrolusite (MnO_2), psilomelane (H_2MnO_4), manganite ($\text{Mn}_2\text{O}_3 \cdot \text{H}_2\text{O}$), and braunite (Mn_3O_4), all of which are black or grey-black and comparatively hard; bog manganese, a soft earthy black oxide; and a small amount of rhodochrosite (MnCO_3), a pink, fairly soft, mineral. Pyrolusite is the most common and most important and when pure contains 63 per cent manganese. It is much softer than the other hard rock ores and can be distinguished in the field by the ease with which it blackens the fingers. Most of the hard rock deposits are replacements in limestone, but they also occur in the form of accumulated nodules and cementing material in siliceous sediments, and as veins in metamorphosed precarboniferous rocks. Canadian production since 1918 has been insignificant. During the first three and a half years of the present war it was increasingly difficult for Canada to obtain supplies from abroad, but this is no longer the case.

"Most of the 200 deposits of manganese known in Canada are in the Maritime Provinces. They are mostly low-grade replacement or bog deposits, and a small amount of high quality ore has been mined in only a few localities.

"Since the outbreak of the war, much attention has been given to the development of known deposits to the search for new sources of supply, and to the exploration of several old properties. Little high-grade ore remains in these old properties, though it is possible that a fair tonnage of medium-grade ore is available. No new deposits have been found, however, and attempts to operate some of the better old properties have been given up after a few months' work. Manganese activities in Canada, including the aforementioned operations at Jordan Mountain have ceased and indications are that they will not be renewed. In any event, production is likely to be small and costly.

"World production is probably about 6,000,000 tons annually, the leading producing countries being Russia, British India, Gold Coast, Brazil, Union of South Africa, the United States and Cuba.

"It is estimated that over 90 per cent of the world consumption of manganese ore is used in the manufacture of iron and steel, the ore so used being termed "Metallurgical". The remainder is termed "Chemical". Metallurgical ore is used for making ferro-manganese, silico-manganese, and spiegeleisen, in which forms it is added to the steel bath. Manganese is beneficial mainly in improving the workability of the steel and in improving the product by acting as a deoxidizer, a desulphurizer, and a re-carbonizer.

"Such ore should contain at least 48 per cent of manganese and not more than 7 per cent iron, 8 per cent silica, 0.15 per cent phosphorus, 6 per cent alumina, and one per cent zinc. It must be low in copper, lead, and barium, and the ratio of manganese to iron should not be less than seven to one. The ore should be hard and in lumps of less than four inches, and not more than 12 per cent should pass a 20-mesh screen. Soft ores, such as bog manganese, are objectionable unless they are briquetted. It takes about two tons of 48 per cent ore to make one ton of standard ferro.

"The Canadian market for metallurgical ore is confined mainly to two manufacturers of manganese ferro-alloys: Electro Metallurgical Company at Welland, and Canadian Furnace Limited, Port Colborne, both in Ontario.

"Chemical grade ores are used mainly in the manufacture of dry batteries. Specifications call for high-grade pyrolusite because of its high available oxygen, which acts as a depolarizer. The ore should contain not less than 75 per cent manganese dioxide (MnO_2) and not more than 1.5 per cent iron; 1.0 per cent alumina; 6.0 per cent silica; 0.03 per cent copper; less than 0.10 per cent of any other metal; and 1.0 per cent moisture. Most of the ore is ground to 200 mesh, but some coarse ground ore of 8 to 12 mesh is also used. Canadian requirements of chemical ore range from 3,000 tons to 4,000 tons a year, most of it being ore from the Gold Coast. Nearly all of it is used by three manufacturers of dry batteries in Ontario.

"Prices of ferro-grade ore depend upon the manganese content and the amount of harmful impurities. Imported ore is usually quoted in cents per long ton unit of 22.4 pounds of contained manganese. United States prices for metallurgical ores are based on a standard duty-free ore containing 48 per cent manganese, 6 per cent iron, 11 per cent silica and alumina combined, and 0.18 per cent phosphorus. The quotation for this grade is 85 cents per long unit of contained manganese at Gulf of Mexico ports, and 90 cents at New York and other Atlantic ports. The premiums and penalties for ores varying from the standard grade can be obtained from the Metals Controller, Ottawa. The prices paid in 1943 by the Government and Canadian consumers for approximately 48 per cent manganese ore were \$46.00 for Indian ore at Welland and \$37.00 per long ton for Gold Coast ore at Canadian ports.

"Prices of chemical grade (battery grade) manganese ores throughout 1943 were \$55 per ton for Brazilian or Cuban ores (80 per cent minimum content of MnO_2) in car lots, f.o.b. New York, exclusive of duty. The delivered price in Canadian currency for finely ground battery grade ore, in bags, imported into Canada from Africa or Montana, U.S.A., was \$60 to \$85 a short ton, depending on mesh and origin."

Imports of manganese oxide into Canada during 1943 totalled 102,468,900 pounds valued at \$1,445,252 compared with 114,777,700 pounds worth \$860,248 in 1942; most of these imports, in both years, originated in the Gold Coast, British India and the United States.

Table 163.—Production (Sales) of Manganese Ore in Canada for Years Specified

Year	Tons	Value	Year	Tons	Value
		\$			\$
1915.....	201	9,360	1935.....	100	800
1916.....	957	89,544	1936.....	221	1,596
1917.....	158	14,836	1937.....	85	817
1918.....	440	6,230	1938.....		
1924.....	584	4,088	1939.....	396	3,688
1925-1929.....			1940.....	152	4,315
1930.....	273	1,356	1941.....	(x)	(x)
1931.....	117	2,893	1942.....	435	8,932
1932-1934.....			1943.....	48	985

(x) 7,500 pounds manganese metal produced at the mine from Nova Scotia manganese ore.

Table 164.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1942 and 1943

Industry	Items	Quantity	Value
			\$
1942			
Electrical apparatus and supplies.....	Manganese dioxide.....	pound 5,377,595	202,273
Paints, pigments and varnishes.....	Manganese Naphthanate.....	pound 88,676	8,748
Steel ingots and castings.....	Ore, manganiferous (foreign).....	pound 64,000	1,600
	Spiegeleisen.....	short ton 2,711	153,054
	Ferromanganese.....	short ton 19,190	2,484,783
	Silicomanganese.....	short ton 8,065	918,774
White Metal Alloys.....	Manganese Metal.....	pound 38,267	19,508
1943			
Electrical apparatus and supplies.....	Manganese dioxide.....	pound 6,105,401	215,613
Paints, pigments and varnishes.....	Manganese Naphthapate.....	pound 70,271	12,880
Steel ingots and castings.....	Ore, manganiferous (foreign).....	pound .....	.....
	Spiegeleisen.....	short ton 367	31,474
	Ferromanganese.....	short ton 19,096	2,356,754
	Silicomanganese.....	short ton 9,568	1,094,239
White Metal Alloys.....	Manganese Metal.....	pound 9,431	4,704

NOTE.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

MERCURY

Mercury production in Canada during 1943 totalled 1,690,240 pounds valued at \$4,559,200 compared with 1,035,914 pounds worth \$2,943,807 in 1942. The recovery of the metal in Canada is made entirely from British Columbia ores. In 1943 the Consolidated Mining and Smelting Company of Canada Limited was the largest producer; the output of this company came from its Pinchi Lake property located 15 miles northwest of Fort St. James in the Omineca mining division of British Columbia; the mine was in continuous operation throughout the year. The balance of Canadian production in 1943 originated at the Takla property of Bralorne Mines Ltd.; this mine is also situated in the Omineca mining division approximately 100 air miles north of Fort St. James; development work was conducted during the entire year and production commenced towards the latter part of November.

The following information is taken from a report "Mercury in 1943" prepared by the Bureau of Mines, Ottawa:

"Cinnabar (HgS), the principal ore of mercury, is a heavy mineral (s.g. = 8.1) with a deep cochineal-red colour and scarlet streak, and contains 86 per cent mercury. In Canada the ore occurs in porous rocks such as altered limestones (ankerite), volcanic breccias or greenstones, and green and purple andesitic lavas. The cinnabar often occurs in veins and stringers of calcite or dolomite within these rocks and may be associated with stibnite (antimony sulphide) and accompanied by globules of metallic mercury.

"The only known deposits of cinnabar in Canada are in British Columbia, by far the most important development being that on the northwest side of Pinchi Lake, Omineca Mining Division, about 40 miles north of Vanderhoof station on the Canadian National Railway. The deposit was discovered in the summer of 1937 and was optioned late in 1938 to Consolidated Mining and Smelting Company and production started in June, 1940.

"Prior to the discovery of the Pinchi Lake Deposits little mercury was produced in Canada and the successful operation of the deposits has brought about a complete change in the Canadian situation in respect to the metal. This mine is the largest single producer of mercury on the American continent and its output is far in excess of the domestic requirements. Ore reserves are estimated to be sufficient to assure continuous output at the present rate for several years.

"A number of cinnabar claims have been staked and prospected along the so-called "Pinch. fault", which runs in a northwesterly direction for at least 100 miles from Pinchi Lake. Of chief importance is the Takla property, east of the headwater of Silver Creek, 85 miles northwest of the Pinchi mine. It is being operated by Bralorne Mines, Limited and production from the 100-ton plant was started in November, 1943.

"Canadian and United States cinnabar ores seldom average over 1.0 per cent mercury but at 1943 prices, an 0.30 per cent ore can be produced at a profit. As a rule, the ore is treated

by roasting the coarsely crushed material in furnaces, usually rotary kilns, through which air is circulated. The sulphur is oxidized to sulphur dioxide, which escapes into the outside air and the mercury is driven off as vapour and is condensed in cooling chambers.

"World production just prior to the war was estimated to be slightly in excess of 5,500 metric tons a year. For many years Italy and Spain have shared honours as the leading producer and prior to the war they accounted jointly for 75 per cent of the world output, while the United States contributed about 11 per cent. Production from Mexico in 1943 reached a peak and is estimated to have shown a fivefold increase since 1939. The pre-war output from Russia, then the fourth largest producer, was about 300 metric tons a year, being about the same as the output from Mexico in 1939. Czechoslovakia, China, Japan, Chile and Peru are also producers of mercury. The Union of South Africa started production at Monarch Kop in 1940 and its output has increased substantially each year since.

"The New York prices for the iron flask of seventy-six pounds of mercury averaged \$75.00 in 1938. The price during most of 1943 was about \$196 a flask, but it decreased to \$190 in December, to \$151.60 in January, 1944, and to \$130 in February. Imports of mercury into Canada from the United States are not subject to duty, but are subject to a sales and war tax amounting to eighteen per cent of the value in Canadian funds. The present price of Canadian mercury is largely governed by that of the United States. Canadian imports into the United States are subject to a tariff of twenty-five cents per pound, or \$19 a flask, in United States currency.

"Specifications call for a minimum of 99.5 per cent mercury and a maxima of .03 per cent antimony and 0.1 per cent arsenic.

"Canada is capable of producing at least eight times the amount of mercury required to meet its present needs and stocks are considerable. Output in the United States is sufficient to supply all of its war demands and production from Mexico in 1943 was mainly exported to the United States. Consequently the Metals Reserve Company (United States) cancelled all contracts with producers for purchase of mercury, effective January 31, 1944. Canadian producers now depend upon domestic orders, orders from the British Government, and upon private sales to United States consumers.

"The position of the Allied countries is now so strong that there is no longer an urgent need for a search for new deposits. Only large deposits of ore that can be mined cheaply are of interest as a reserve for the future.

"In Canada about seventy-five per cent of the mercury consumed is used in the medicinal, pharmaceutical, and in heavy chemical industries, particularly in the form of mercury sulphate as a catalyst. The consumption of mercury in Canadian gold mines has decreased owing to wider use of cyanidation and improvements in the recovery of the mercury after amalgamation. Gold mining now uses about seven per cent of the total mercury consumed."

Table 165.—Production of Mercury in Canada

Year	Pounds	\$	Year	Pounds	\$
1895.....	5,396	2,343	1939.....	436	1,226
1896.....	4,408	1,940	1940.....	153,830	369,317
1897.....	684	324	1941.....	536,304	1,335,697
1924-1927 (x).....	350	(x)	1942.....	1,035,914	2,943,807
1938.....	760	760	1943.....	1,690,240	4,559,200

(x) Data from a report issued by Bureau of Mines, Ottawa; value not recorded.

Table 166.—Consumption of Mercury in Specified Canadian Industries, 1939-1943

	1939	1940	1941	1942	1943
	(Pounds)				
Medicinals and pharmaceuticals.....	20,473	30,246	67,607	78,362	79,786
Heavy chemicals (catalyst).....	58,954	30,904	35,319	50,968	72,531
Electrical apparatus.....	2,161	1,899	25,738	42,313	28,756
Non-ferrous smelters.....	857	1,636	4,635	1,201	1,838
Petroleum refineries.....	359	328	920	684	372
Gold mines.....	6,313	6,000	11,091	10,000	.....
Ammunition.....	.....	4,630	8,217	.....	.....
Other industries.....	500	.....	2,591	1,650	5,752
Total accounted for.....	89,617	75,643	156,118	185,178	199,065

MOLYBDENITE

Commercial shipments of molybdenite concentrates in Canada during 1943 were made solely from Quebec and Ontario mines. Production during the year under review totalled 784,715 pounds valued at \$549,515 compared with 227,586 pounds worth \$134,963 in 1942. The output in 1943 came principally from the properties of Indian Molybdenum Limited in the Abitibi region, La Corne mine near Val d'Or, and the Quyon Molybdenum Company at Quyon, Province of Quebec. A small amount of customs ore from Mont Cerf, Quebec and from the Algoma district, Ontario, was treated in the La Corne mill.

A report on "Molybdenum in 1943" as prepared by the Bureau of Mines, Ottawa, contains the following information:

"Molybdenite, the chief ore of molybdenum, is a soft and shiny steel blue-grey sulphide containing 60 per cent of the metal. In Eastern Canada it is usually found in pegmatite dykes or along the contacts of limestone and gneiss, commonly associated with greenish-grey pyroxenites in which other metallic minerals, such as pyrite and pyrrhotite often occur. In northern and western Ontario and in British Columbia, molybdenite usually occurs in quartz veins, intruded into granites, or diorites. It generally occurs in the form of soft, pliable flakes or leaves, but is sometimes semi-amorphous, filling cracks and smearing the rock surface. It can readily be distinguished in the field by the olive grey-green smear it leaves when rubbed on glazed white porcelain or enamel. Graphite, for which it is often mistaken, leaves a grey-black smear.

"During 1941 and 1942 intensive investigation of all possible Canadian sources of molybdenum was necessitated because of the inadequate supply of the metal and the advice from Washington that there would be further curtailing of exports to Canada. As known Canadian deposits could not compete at the market price, the Metals Controller arranged to pay producers 85¢ per pound of contained sulphide in concentrate containing 80 per cent or more MoS_2 . (U.S. market price is 45 cents). Since August, 1943, there has been a marked improvement in the supply as a result of the curtailment in production of certain armaments and of the large use of scrap metal containing molybdenum. Large stocks are on hand in Canada and the United States, consumption has decreased and production is abnormally high. Production from the Dome (Indian Molybdenum) and LaCorne mines in Quebec is more than sufficient to supply Canada's present requirements.

"Present indications are that the Abitibi area in Quebec will continue to be the principal source of production in Canada. The area is about 100 miles from the Ontario boundary and in general extends from Rouyn to Val d'Or. It is probably one of the most favourable localities for the discovery of other workable deposits.

"Owing to the greatly increased demand for molybdenum, there was much development and prospecting activity in the first half of the year on some of the 400 occurrences and deposits known throughout the Dominion, a few of which are mentioned below.

"In Quebec, Wartime Metals Corporation took over the LaCorne property of the Molybdenite Corporation of Canada in July 1942, and made arrangements for Siscoe Gold Mines, Limited to operate the mine. Production at the 200-ton mill began in May, 1943, and by the end of December, nearly 50,000 tons of ore containing between 0.6 and 0.7 per cent MoS_2 had been treated. The mine is the largest Canadian producer of molybdenite, which occurs as relatively small flake scattered through quartz veins in which white sericite schist is abundant in places.

"In 1942 Dome Exploration Company discovered a large body of disseminated molybdenite apparently of good grade on the southern part of the old St. Maurice Mines property in Preissac township, about 20 air miles northwest of the LaCorne mine. Indian Molybdenum, Limited, the operator, is developing the property by means of a flatly inclined shaft, which

extends to a vertical depth of 200 feet. Diamond drilling on the surface had indicated an ore zone about 400 feet long and nearly 40 feet wide, averaging about 0.9 per cent MoS_2 , but development has shown that the grade is less than 0.5 per cent. The molybdenite is similar to the LaCorne ore; it occurs in a quartzose-sericite zone dipping about 50° northeast and is bounded by faults between red and grey muscovite and biotite granites. At the end of May 1944, the mill was operating near its capacity rate of 500 tons of ore daily and was producing a concentrate containing about 90 per cent MoS_2 . The Company has a contract with the Dominion Government to deliver 2,000,000 pounds of contained molybdenum sulphide in concentrate by the end of 1944.

"About 35 miles northwest of Ottawa, Quyon Molybdenite Company, the second largest Canadian shipper of molybdenite, treated close to 150 tons of ore a day of an average grade of 0.25 per cent MoS_2 . The concentrate produced is converted to molybdic oxide in a small roasting plant on the property, and is then briquetted and shipped to steel manufacturers in Canada. During the last war this mine was the world's largest producer of molybdenum and it contributed nearly 80 per cent of Canada's output before 1939. Extensive diamond drilling by the Dominion Government in 1942 indicated considerable reserves of low-grade ore. The company had a contract with the Dominion Government to produce a total of 100 tons of contained molybdenum in the oxide. The contract was fulfilled early in May, 1944. Vie-Ore Molybdenite Company which operates the old Bain mine in Masham township, 12 air miles northeast of the Quyon mine, increased the capacity of its pilot mill from the former rate of 10 tons a day to 50 tons a day and erected more buildings on the property.

"Farley Mining Company continued work on the LaFleur deposit in Egan township near Mont Cerf, 15 miles north of Maniwaki, for a few months. It shipped 76 tons of 1.15 per cent ore to the Zenith mine near Renfrew, Ontario, in the fall of 1942, and in March, 1943, a few tons of high-grade cobbled ore to the LaCorne mill; that shipped to the Zenith mine was re-cobbled and shipped to LaCorne for treatment.

"Cremar Molly Mines, Limited did considerable diamond drilling in Gaudette township, near Searchmont, Algoma district. Fairly good ore was found on the surface, but very little was found at depth by drilling. The Company shipped a car lot of ore to the LaCorne mill. About 75 miles northeast, Deep Lake Gold Mines, Limited, Akron, Ohio, prospected the Peters-Qilty showings west of Limer station. Wartime Metals Corporation discontinued its operations at the Zenith mine southwest of Renfrew, early in 1943, as the deposit proved too low grade. The Company shipped a car lot to the LaCorne mill in March 1943. Some prospecting was also done in the Tory Hill property near Wilberforce.

"Molybdenite concentrate is converted into an addition agent that is introduced into steel as molybdenum trioxide, ferromolybdenum, or calcium molybdate. The oxide is moulded into briquettes and 81 per cent of the Canadian consumption of molybdenum in 1943 was in this form and 17 per cent in the form of ferromolybdenum. There are nearly 50 users of molybdenum in Canada, but 94 per cent of the total consumption is by five steel manufacturers. Consumption in 1943, exclusive of scrap, was about 600 short tons compared with 72 tons in 1939.

"Molybdenum has a widening range of uses, but by far the greater part of the output is used in steel to intensify the effects of other alloying metals, particularly nickel, chromium, and vanadium. These steels usually contain from 0.15 to 0.4 per cent molybdenum but in some instances the percentage is considerably higher.

"In Canada throughout 1943 the Metals Controller contracted to purchase all domestic molybdenum products of marketable grade at a bonus price of not less than 85 cents per pound of contained sulphide in concentrates or \$1.75 per pound of contained molybdenum in the trioxide, f.o.b. Ottawa. After December 31, 1943, owing to changed conditions, no more contracts were given. New producers will have to sell in the open market at the normal price which is about 50 cents (Canadian funds). Canadian ore and concentrate shipped to the United States is subject to a duty of $17\frac{1}{2}$ cents a pound of contained molybdenum.

"The price per pound of contained molybdenum, f.o.b. Toronto in Canadian funds for the following imported compounds is approximately: Calcined molybdate (42% Mo), 98 cents; ferromolybdenum (60% Mo), \$1.15; and molybdic oxide (52% Mo), 98 cents. The calcium molybdate is sold in bags of about 12½ pounds containing exactly 5 pounds of molybdenum. The molybdic oxide briquettes weigh five pounds each and contain 2½ pounds of molybdenum.

"United States specifications for concentrate dried at 212°F. are: MoS₂, minimum 85 per cent; copper, maximum 0.6 per cent; iron, maximum 3.0 per cent; combined phosphorus, antimony and tin, maxima 0.2 per cent.

"Prior to the war, 91 per cent of the world production, estimated at 16,500 tons of metallic molybdenum, came from the United States. Climax Molybdenum Company, at Climax, Colorado, the world's largest producer, is treating daily 18,000 tons or more of ore containing about 0.5 per cent MoS₂ and probably contributes 70 per cent of United States total. The remainder is obtained as a by-product of some large copper producers in Utah, New Mexico, and Arizona. The molybdenum Corporation of America near Questa, New Mexico, is the only Company except Climax, that produces molybdenite solely for the recovery of molybdenum. The Molybdenum Corporation is also developing the Urad mine, Colorado, for the United States Government and production is expected to start in the summer of 1944.

"Production from Cananea, Mexico, is estimated at the equivalent of 850 tons of the metal a year; and a slightly smaller production is obtained as a by-product from the Braden Copper Mine at Sewell, Chile. Prior to the war, the Knaben mine in Norway was the largest producer outside the American continent, its output in 1940 being 500 short tons. Other producing countries were Peru, French Morocco, Korea, Greece, Turkey, Yugoslavia, Australia, and recently Manchuria."

Table 167.—Production of Molybdenite in Canada, 1902-1943

Year	Ores milled	Ores and concentrates shipped or used		Total MoS ₂ content of shipments
	Tons	Tons	Value (a)	Pounds
			\$	
1902.....	(c) 3	3.3	400	(b)
1903.....	(c) 600	85.0	1,275	(b)
1904-1913.....				
1914.....	(c) 166	16.5	2,063	3,814
1915.....	216	39.0	28,920	29,210
1916.....	9,100	610.0	188,316	156,461
1917.....	22,605	1,554.3	320,006	330,316
1918.....	33,935	461.3	428,807	378,482
1919.....	6,783	46.0	69,203	83,002
1920-1923.....				
1924.....	668	10.0	9,370	18,739
1925.....	2,779	15.3	11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	250	1,222
1932-1936.....				
1937.....	5,307	8.25	8,147	(b)
1938.....	(b)	6.5	4,500	(b)
1939.....	1,492	1.3	816	(b)
1940.....	3,936	11.1	10,280	(b)
1941.....	28,100	98.3	88,470	173,991
1942.....	39,708	113.7	134,963	158,780
1943.....	120,576	392.4	549,515	653,200

(a) Value as given by the operators 1902 to 1939; 1940-1943 value estimated using market or Government prices.

(b) Not known.

(c) Mined.

Imports into Canada of calcium molybdate for the manufacture of steel totalled 1,144,455 pounds worth \$957,159 in 1943 compared with 1,453,769 pounds worth \$1,119,531 in 1942.

Table 168.—Molybdenite Mining in Canada, 1943

	Quebec	Ontario	British Columbia	Canada
Active firms.....No.	(a) 9	(b) 2	(d) 1	12
Capital.....\$	3,666,753	6,060	5	3,672,813
Employees—On salary.....No.	32	5	1	38
Wage-earners.....No.	202	17	2	221
Total.....No.	234	22	3	259
Salaries and wages—Salaries.....\$	73,027	9,009	283	82,319
Wages.....\$	378,180	13,830	2,942	394,952
Total.....\$	451,207	22,839	3,225	477,271
Gross value of production.....\$	549,515	(c)	.....	549,515
Fuel and electricity used.....\$	70,516	3,445	.....	73,961
Process supplies used.....\$	78,103	3,420	1,549	81,072
Freight and treatment charges.....\$	3,118	235	.....	3,353
Net value of production.....\$	399,778	(c)	.....	391,219

(a) 3 Producing.

(b) 2 Producing.

(c) Production credited to 1944 as ore not milled in 1943.

(d) Data not available.

MONAZITE

Monazite is the principal source from which are produced thorium, cerium and other rare earth oxides. No commercial production of monazite in Canada has ever been officially reported. The Bureau of Mines, Ottawa, reports that there are a few occurrences in Nova Scotia, Quebec and British Columbia; none of which are of commercial importance; it is usually found as small crystals in granites and pegmatites in the Canadian shield and small quantities occur in association with the black sands of the Quesnel River, British Columbia. The United States Bureau of Mines states that the beach deposits of black sands in Travancore in British India, along the coasts of Espirito Santo, Rio de Janeiro and Bahia in Brazil, and in Netherlands Indies have supplied the bulk of United States monazite requirements in the past, as a by product in the recovery of ilmenite, rutile and zircon sands. Formerly, the only commercial constituent of monazite was thoria, which was used for gas mantles, and monazite is still marketed upon the basis of its thoria content, although commercial interest now centres on its content of ceria and other rare earth oxides; probably 50 per cent of monazite derivatives are consumed (chiefly as fluorides) in the cores of arc carbons to increase lighting intensity in motion picture projectors, therapeutic lamps and searchlights, in about that order. Pyrophoric alloys for use in sparking flints take about 25 per cent of the monazite consumed and the remainder is distributed among a large variety of specialty uses, principally optical glassware.

Cerium products are produced from cerium chloride in Canada at Shawinigan Falls, Quebec, by Shawinigan Chemicals Limited; sparking flints are manufactured in Montreal, Quebec by Cerium Company Limited.

Monazite was quoted by "E & M J Markets", New York, August, 1944, at \$60 per ton minimum, 8 per cent thoria.

Complete data relating to world production of monazite are not at present available and imports of monazite, described, as such are not shown separately in Canadian trade reports. Imports of salts or bases of thorium in 1943 were valued at \$11,187 compared with \$15,587 in 1942.

PITCHBLEND

Pitchblende, the ore from which radium and uranium products are made, is mined in Canada only in the Great Bear district of the Northwest Territories. The only company to officially report the mining and treatment of pitchblende ore in 1943 was the Eldorado Mining & Refining Company Ltd. Both the mine and mill of the company located at Port Radium, were operated continuously throughout 1943 and a considerable tonnage of pitchblende concentrates were shipped to the Eldorado radium refinery situated at Port Hope, Ontario. In January,

1944 a new company, Eldorado Mining & Refining, was formed, as a Crown company, owned by the Dominion of Canada, to take over all assets of the old company. Data relating to the production of pitchblende products in Canada have not been available for publication since 1940.

In 1942 the radium-uranium property of Bear Exploration and Radium Limited, located at Contact Lake, Great Bear Lake district of the Northwest Territories, was acquired by the International Uranium Mining Company Limited; it was reported that a geological survey of the property was being made in 1944, and also that exploration of the deposit by diamond drilling had commenced.

A report prepared by the Bureau of Mines, Ottawa, states:

"Most of the world production of radium and uranium ores has come from the Belgian Congo, Canada, and the United States. The American material consists mainly of low-uranium carnotite, found mainly in Colorado and Utah, and now mined chiefly for its vanadium content, the present recovery of uranium and radium being small. Ores of the Belgian Congo are mainly a complex assemblage of secondary uranium minerals resulting from the weathering of original pitchblende. The remainder of the world production has come mostly from Czechoslovakia, Portugal, England, Australia, and Russia, but the deposits in most of these countries are small and low-grade and are of minor importance at present."

"E and M. J. Metal Markets", New York, quoted radium at \$25 to \$30 per Mg of radium content, depending on quantity; August, 1944.

Table 169.—Canadian Refinery Production of Pitchblende Products

Year	\$	Year	\$
1933(b).....	247,900	1938.....	1,045,458
1934.....	159,400	1939.....	1,121,553
1935.....	413,700	1940.....	410,176
1936.....	605,500	1941-1943.....	(a)
1937.....	876,540		

(a) Not available for publication.

(b) First production.

SELENIUM

Production of selenium in the Dominion during 1943 totalled 374,013 pounds valued at \$654,523 compared with 495,369 pounds worth \$951,108 in 1942. Of the 1943 output, 216,498 pounds were obtained from Quebec ores, 82,000 pounds from Ontario, 5,239 pounds from Manitoba and 70,276 pounds from Saskatchewan. The element is recovered as a by-product in Canada in the treatment of copper refinery residues by the International Nickel Company of Canada Limited at Copper Cliff, Ontario, and at Montreal East, Quebec, by Canadian Copper Refiners Limited.

According to the Bureau of Mines, Ottawa, world production of selenium is believed to approximate 600 to 700 short tons a year, the United States and Canada being the principal sources of supply. Small quantities are produced by several countries, including Russia, Rhodesia, and Mexico. It is reported that selenium is being recovered from the copper-gold-arsenical ores of the Boliden mine, Sweden.

Selenium is used chiefly in the glass and pottery industries as a coloring agent (as in ruby glass) and to neutralize the effect of objectionable oxides. A large amount of selenium is used for controlling the colour of glass, especially in the production of pink or ruby glass. It is used in the photo-electric cell, or electric eye, which has many industrial applications, and in alloying stainless steel for screw and bolt stock, where it develops improved cutting and threading qualities. It is employed to improve the machinability of copper and copper alloys. Selenium and tellurium are used in the free machining of copper alloys where they offer certain advantages in lead and sulphur. Selenium has a large potential market in certain rubber compounding industries and is being used for the vulcanizing and fireproofing of switchboard cables and to increase the resistance of rubber to abrasion, research for such uses being still under way.

It is used in the manufacture of certain kinds of paint and of certain dyes. As selenium oxychloride, it is a powerful solvent of many substances. Rapid progress is also being made in the production of high-quality selenium rectifiers, which require large quantities of selenium.

Selenium is marketed as a black to steel-gray amorphous powder, but cakes and sticks are also obtainable. Among the other products marketed are ferro-selenium, sodium selenite selenious acid, and selenium dioxide.

Since August, 1938, the nominal price for selenium, black powdered, 99.5 per cent pure at New York has been \$1.75 a pound. The Glass Industry periodical gives the following quotations for selenium salts in 1943: barium selenite, \$1.40 to \$1.60 a pound, and sodium selenite, \$1.50 to \$1.65 a pound.

Consumption of selenium in the manufacture of glass in Canada during 1943 was estimated at 1,687 pounds compared with 3,647 pounds in 1942.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry.

Table 170.—Production of Selenium in Canada, 1931-1943

Year	Pounds	\$	Year	Pounds	\$
1931(x).....	12,500	40,850	1938.....	358,929	622,742
1932.....			1939.....	150,771	266,714
1933.....	48,221	70,345	1940.....	179,860	343,533
1934.....	104,924	171,311	1941.....	406,930	777,236
1935.....	366,425	703,536	1942.....	495,369	951,108
1936.....	350,857	621,017	1943.....	374,013	654,523
1937.....	397,227	687,203			

(x) First commercial production in Canada.

TANTALUM-COLUMBIUM

Canada produces no tantalite or columbite and according to the Bureau of Mines, Ottawa, the known Canadian occurrences of these minerals are scarce and of undetermined economic interest. The minerals tantalite and columbite are the tantalate and columbate, respectively of iron and manganese, with the general formula $(\text{Fe}, \text{Mn})(\text{Ta}, \text{Cb})_2\text{O}_6$. They grade one into the other according as whether tantalum or columbium predominates. Both tantalite and columbite are of increasing importance in the war effort and tantalite has been placed in the group of "strategic" minerals having the highest priority rating. The occurrence of all tantalum-columbium minerals is restricted to granite-pegmatites, or to residual or alluvial deposits derived from such rock. The chief world sources of tantalite proper have been Western Australia, Belgian Congo, Southern Rhodesia, Uganda, United States and Brazil. The supply of columbite has come mainly from Nigeria, Belgian Congo, Southwest Africa, Argentina and Brazil. The annual world output of tantalite-columbite is small and complete data on same are not available at present. Tantalum metal is highly resistant to corrosion and possesses remarkable conductivity for heat; one of its important uses is in equipment, such as stills, condensers, tubes and heaters in chemical plants and laboratories; it is being used to an increasing extent in the field of electronics. Columbium is employed chiefly as an alloying component in various special-purpose steels, and also in copper, aluminum and other metals.

There are no users of tantalum or columbium ores in Canada, the chief world market being in the United States. The principal American consumer-buyer of tantalite is Fansteel Metallurgical Corporation, North Chicago, Illinois, and of columbite, Electro-Metallurgical Company, 30 East 42nd Street, New York City. These companies have been pioneers in the fields of industrial applications for tantalum and columbium metals, alloys, and products, respectively, and are the leading companies engaged in treating the ores.

Under the latest purchasing schedule, of May, 1943, the following provisions were made for the two classes of ore by the Metals Reserve Company in the United States:

Tantalite: Minimum tantalum oxide content, 40 per cent, with maximum tin oxide content 3 per cent, and maximum titanium oxide 3 per cent. For small lots of 100 to 200 pounds, the material must consist of clean tantalite crystals. The price for 40 per cent ore was set at \$1.75 per pound of contained tantalum oxide, rising by increments of 5 cents per pound to \$3.25 to 70 per cent ore, with no payment made for contained columbium oxide.

Columbite: Minimum columbium oxide content, 50 per cent, with maximum tin oxide content 5 per cent, and maximum titanium oxide 7.5 per cent. The material must be in the form of clean crystals. The price for small lots of 100 to 500 pounds was set at 25 cents per pound of ore, and for larger lots at 50 cents per pound of contained columbium oxide, with no payment for contained tantalum oxide.

Tantalum metal prices in 1943 were \$160.60 a kilogram for C.P. rod, and \$143 for sheet, with discounts on volume business. Columbium metal was quoted at \$560 a kilogram for rod, and \$500 for sheet. Ferro-Columbium, 50 to 55 per cent, sold for \$2.25 per pound of contained columbium.

(NOTE: Additional information on the occurrence and distinguishing characteristics of tantalite and columbite, is contained in the Prospectors Guide, Third Edition, issued by the Mines and Geology Branch, Ottawa, in 1943.)

TELLURIUM

Canadian production of tellurium, as with selenium, represents the recovery of metal as a by product in the refining of converter copper at Copper Cliff, Ontario, by the International Nickel Company of Canada Limited, and of blister and anode copper at Montreal East, Quebec, by Canadian Copper Refiners Limited. The Canadian output in 1943 totalled 8,600 pounds valued at \$15,050 compared with 11,084 pounds worth \$17,735 in 1942. The 1943 production originated solely in the nickel-copper ores of the Sudbury district, Ontario; in addition to its recovery from these same ores, the metal was obtained in 1942 in the refining of blister copper produced by the Hudson Bay Mining and Smelting Company from the Flin Flon mine ores of Manitoba and Saskatchewan.

According to the Bureau of Mines, Ottawa, the world production is estimated at 150 short tons a year, or about double the pre-war figure, and Canada and the United States appear to be the main sources of supply.

Metallic tellurium, until quite recently, was of little industrial importance. Formerly it was used to a small extent in some radio work and also in the photographic arts and for blackening art-silverware. Small quantities are used as a colouring agent in the ceramic industry. When alloyed with lead, the tensile strength and toughness of the lead is increased greatly. Lead alloys containing from 0.1 to 0.5 per cent tellurium have been in use for some time in applications requiring resistance to vibration and corrosion. The use of small quantities of tellurium as a substitute for tin in the lead used for sheathing electric wire cables is reported to improve the resistance of the cables to heat and corrosion. It has also been used for improving the machining qualities of certain steels. Very finely powdered tellurium is used as rubber-compounding material. Its presence is stated to shorten the time of curing and to greatly improve the resisting qualities of the product. A new use for tellurium is as a carbon stabilizer in cast iron, when it is used in the form of a ferrotellurium.

A nominal price for tellurium of \$1.75 per pound at New York prevailed throughout 1943.

Table 171.—Production of Tellurium in Canada, 1934-1943

Year	Pounds	\$	Year	Pounds	\$
1934 (x).....	5,130	25,599	1939.....	2,940	4,769
1935.....	16,425	32,850	1940.....	3,491	5,607
1936.....	35,591	62,997	1941.....	11,453	18,394
1937.....	41,490	71,777	1942.....	11,084	17,735
1938.....	48,237	82,967	1943.....	8,600	15,050

(x) First commercial production in Canada.

In 1943 Canadian steel foundries consumed 135 pounds of tellurium compared with 50 pounds in 1942. White metal foundries used 453 pounds in 1943 against 612 pounds in 1942.

TIN

The following information has been supplied by the Bureau of Mines, Ottawa:

"Tin is widely distributed, but in only a few countries are the deposits sufficiently large for commercial development. Cassiterite (SnO_2) is the only important ore of tin and in the pure state it contains 78.6 per cent of the metal. Stannite, a sulphide of copper, iron, and tin, has little importance as an ore. In British Columbia, stannite is present in the ore of the Snowflake property, near Revelstoke, and cassiterite and stannite have been noted at several other places in the province. The small cassiterite content of the silver-lead-zinc ore of the Sullivan mine, at Kimberley now being recovered from the zinc tailing, is the source of Canada's production of tin. Cassiterite occurs also in many other places in Canada, but no commercial deposits have so far been found. In the unglaciated parts of Yukon, stream tin has been found in small quantities, but no serious attempt seems to have been made to test the gravels thoroughly for tin. During the past few years it has become apparent that many creeks in the Mayo district carried some crystalline cassiterite in their gold placers. Some evidence has been gathered showing the likelihood of there being some 200 to 300 tons of tin available as cassiterite in the placers of Dublin Gulch and Haggart Creek. In August, 1943, a lode source of this tin was found on the north side of Dublin Gulch assaying from $\frac{3}{4}$ to $1\frac{1}{2}$ per cent in tin across an approximate width of three feet.

"The tin concentration plant of Consolidated Mining and Smelting Company at Kimberley commenced operation on March 1st, 1941, and has been functioning very satisfactorily. The plant for the production of refined tin was in commercial operation in April, 1942. The tin content of the ore is small and the recovery is proportionately small.

"The tin produced at Kimberley, British Columbia, and the small domestic recovery of secondary tin are far from sufficient to meet the Canadian requirements, which in peacetime amounted to about 3,000 tons a year, and are now much larger. They were obtained mostly from smelters in the Straits Settlements. The position of the allied countries in respect to tin became critical with the capture by Japan of these smelters and of the Malayan tin mines, and the civilian use of the metal has been greatly curtailed. The search for commercial deposits of tin in Canada was continued and some occurrences of possible economic interest were found by a Geological Survey party in the Yellowknife area, Northwest Territories. Elsewhere, the results were not encouraging.

"The prices of tin in New York were fixed in August, 1941 at 52 cents a pound and remained at that level to the end of the year and throughout 1942 and 1943."

In July, 1944 "E & M J Metal and Mineral Markets", New York, reported that the tin producers maintain that they performed a genuine economic service throughout international tin control, and hope to continue with the plan, perhaps in some modified form, in the post-war period. In reviewing tin control, the International Tin Committee holds that its inter-governmental scheme should merit the attention of economic experts of the United Nations, because the advantages of stabilizing prices of primary commodities are now generally acknowledged, and the issue may have to be decided very soon.

Total commercial production of tin from Canadian ores was as follows:—1941, 64,744 pounds valued at \$33,667; 1942, 1,237,863 pounds valued at \$643,689 and 1943, 776,937 pounds valued at \$450,623.

Table 172.—Consumption of Tin in Canada by Industries, 1939-1943

	1939	1940	1941	1942	1943
	(short tons)				
Brass and bronze foundries.....	129	277	437	217	357
White metal foundries.....	1,640	2,087	3,141	1,530	1,106
Steel foundries (chiefly for tin plate).....	810	1,207	2,346	1,428	1,148
Iron foundries.....	52	84	224	49	88
Galvanizing plants.....		90	50	226	28
Jewellery and silverware plants.....	45	64	146	15	.....
Electrical apparatus plants.....	34	43	56	6	42
Miscellaneous industries.....	77	16	36	30	10
Total accounted for.....	2,787	3,868	6,436	3,501	2,779

Production of secondary tin in Canadian plants in 1943 was estimated at 16,560 pounds compared with 64,511 pounds in 1942.

Table 173.—Imports Into Canada and Exports of Tin and Tin Products, 1942 and 1943

Item	1942		1943	
	Pounds	\$	Pounds	\$
IMPORTS				
Tin in blocks, pigs or bars.....	7,205,100	4,166,714	2,631,100	1,504,438
Tin foil.....	337,691	53,366	829,394	106,174
Collapsible tubes.....		63,600		155,722
Tin bichloride and tin crystals.....	38,589	15,572	11,054	5,031
Oxide of tin and copper.....	129,713	36,427	142,986	30,274
Phosphor tin and phosphor bronze in blocks, bars, plates, etc.....	711,305	329,039	708,624	321,408
Tin plate food containers.....		426,209		258,084
Tin plate containers, n.o.p.....		445,485		84,721
Sheets, tin and lead coated.....	31,258,700	1,409,021	20,230,500	877,446
Manufactures of tin plate painted, etc., manufactures of tin, n.o.p.....		703,298		498,633
Kitchen or dairy holloware of iron or steel coated with tin.....		149,567		82,892
Arseniate, biarseniate and stannate of soda.....	96,450	28,986	83,329	18,712
Tin plate scrap.....	1,754,000	15,813	2,354,000	21,285
Tin plate, n.o.p.....			64,485,400	3,679,160
EXPORTS				
Tinware.....		21,805		10,236
Tin plate scrap.....	38,799,000	222,573	26,799,600	135,557

TITANIUM

Commercial shipments of titanium ore from Canadian mines totalled 69,437 short tons valued at \$308,290 in 1943 compared with 10,031 tons worth \$50,906 in 1942. Production during both of these years came from deposits located at St. Urbain, Charlevoix county, Province of Quebec.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"All known occurrences of titanium in Canada of any possible economic interest are in the provinces of Quebec and Ontario.

"Ilmenite or titanite iron (FeTiO_3) in commercial quantities and carrying from 18 to 25 per cent of titanium is found at St. Urbain in Charlevoix county, and at Ivry in Terrebonne county, Quebec. Rutile (TiO_2), which usually contains 54 to 59 per cent titanium, is found mixed with the ilmenite in parts of one of the St. Urbain occurrences and in sufficient quantities to make it of possible importance for the rutile alone, this being the only known workable deposit of rutile in Canada. Titaniferous magnetite deposits (magnetite carrying 3 to 15 per cent titanium) occur on the Saguenay River, near Lake St. John, and at Bay of Seven Islands, both in Quebec, and on the shores of Seine Bay and Bad Vermilion Lake in western Ontario.

"A few thousand tons of ilmenite is shipped annually from the St. Urbain deposits, part of it to Niagara Falls, New York, presumably for use in the manufacture of ferrotitanium, and part of it to plants of the General Electric Company in the United States. No shipments from the Ivry deposits have been reported for several years.

"The world production of titanium ore is estimated at about 260,000 tons of ilmenite, which would yield 115,000 tons of titanium pigment, and 3,000 tons of rutile. India is the principal producer of ilmenite, the other producers being Norway, Malaya, Portugal, Australia, United States, and Canada. Brazil is the principal producer of rutile, and Norway is second in importance.

"The United States has become virtually self-sufficient in supplies of ilmenite with the completion of the plan to exploit the Adirondack titaniferous iron ores.

"Commercial uses for titanium in recent years have continued to increase independently of the trend of general business. Ilmenite continues to be used chiefly in the manufacture of white pigment, and it is used to a smaller extent for making ferro-alloys. In metallurgy, titanium is not only an effective deoxidizer and cleansing agent, but also an alloying element. By addition of titanium, chrome-nickel steels are made more resistant to corrosion and chrome-molybdenum steels become easier to weld."

"E and M J Metal and Mineral Markets", New York, August 1944, quotations for titanium ore were: Per gross ton, ilmenite, 60 per cent TiO_2 , f.o.b. Atlantic seaboard, \$28 to \$30, according to grade and impurities; quotations nominal. Rutile, per pound, guaranteed minimum 94 per cent concentrate 8 to 10 cents, nominal.

Table 174.—Production of Titanium Ore in Canada(x), 1927-1943

Year	Short ton	\$	Year	Short ton	\$
1927.....	2,029	8,960	1936.....	2,566	18,318
1928.....	2,244	6,732	1937.....	4,229	26,432
1929.....	2,748	7,359	1938.....	207	1,449
1930.....	412	1,239	1939.....	3,694	21,267
1931.....	1,509	10,261	1940.....	4,535	24,510
1932.....			1941.....	12,651	49,110
1933.....			1942.....	10,031	50,906
1934.....	2,023	14,161	1943.....	69,437	308,290
1935.....	2,288	16,400			

(x) All from Quebec.

Table 175.—Consumption of Titanium Pigments in Canadian Paint Industry, 1931-1943

Year	Pounds	Cost at works	Year	Pounds	Cost at works
		\$			\$
1931.....	745,207	89,761	1937 (x).....	3,748,341	362,869
1932.....	691,304	96,759	1938 (x).....	3,903,337	378,548
1933.....	1,061,249	128,969	1939 (x).....	5,088,234	494,914
1934.....	1,710,188	186,678	1940 (x).....	6,138,760	616,360
1935.....	2,513,026	261,506	1941 (x).....	8,971,865	1,004,591
1936 (x).....	2,456,265	269,130	1942 (x).....	7,034,376	578,894
			1943 (x).....	9,558,617	769,909

(x) In 1936 includes 1,396,337 pounds of pure titanium white valued at \$193,638. In 1937 the quantity of pure titanium white totalled 1,299,857 pounds valued at \$193,107; in 1938, 1,341,359 pounds at \$200,552; in 1939, 1,855,288 pounds worth \$275,103; in 1940, 2,297,248 pounds valued at \$344,945; in 1941, 3,076,490 pounds worth \$560,621; in 1942, 4,168,097 pounds worth \$820,990, and in 1943, 4,436,382 pounds worth \$811,086.

In 1939 there were 118 tons of ferrotitanium valued at \$23,498 consumed in the manufacture of steel in Canada; in 1940, 118 tons worth \$24,233; in 1941, 181 tons valued at \$52,128 in 1942, 439 tons worth \$66,555 and in 1943, 614 tons valued at \$118,416.

TUNGSTEN

Shipments of tungsten ore concentrates from Canadian mills during 1943 totalled 1,508,621 pounds valued at \$1,083,538 compared with 520,981 pounds worth \$406,275 in 1942. The WO_3 content of the 1943 shipments totalled 817,763 pounds or an average of 54.2 per cent of the total production from all sources. Of the 1943 output of tungsten concentrates, 19,374 pounds came from mineral deposits located in Nova Scotia, 5,401 pounds from Quebec, 494,405 pounds from Ontario, 16 pounds from Manitoba, 976,622 pounds from British Columbia, 720 pounds from the Northwest Territories and 12,083 pounds from Yukon.

The following information is from a report "Tungsten in 1943" as prepared by the Bureau of Mines, Ottawa:

"Wolframite, $(\text{Fe}_2\text{Mn}) \text{WO}_4$, is the principal ore of tungsten, the next in importance being scheelite, (CaOW_4) , a calcium tungstate. The former is a dark brown to black heavy mineral, which contains 76.4 per cent WO_3 (tungstic oxide) when pure, and is not common in Canada. Scheelite, the chief Canadian ore of tungsten, is a heavy, fairly soft, usually buff, but sometimes white mineral with a dull lustre, which contains 80.6 per cent WO_3 when pure. It is commonly associated with quartz and frequently occurs in gold-bearing veins and in certain contact metamorphic deposits. It can be detected readily (in the dark) by its brilliant pale bluish-white fluorescence under Ultra-violet light and purple filter. Prospectors' ultra-violet lamps for this purpose are not made in Canada, but may be imported duty free from the United States. Information on these lamps may be obtained from the Bureau of Mines, Ottawa, or from the Provincial Departments of Mines. As a result of the marked improvement in the supply situation in 1943, Canadian requirements of tungsten are no longer difficult to obtain.

"Consolidated Mining and Smelting Company's Red Rose property in British Columbia, and Hollinger Consolidated Gold Mines Limited, Timmins, Ontario, contributed about 61 and 30 per cent respectively of the total WO_3 content of the shipments. About five per cent of the total was shipped by Little Long Lac Gold Mines, east of Lake Nipigon, Ontario, and Bradorne Gold Mines, Bridge River area, British Columbia. The remainder came from a number of shippers who sent their crude ore to the Bureau of Mines, Ottawa, or to Val d'Or, Quebec, for treatment. The figure for total shipments in 1943 does not include a production of approximately 135 tons of WO_3 in concentrate from the Emerald property in southern British Columbia, which was stockpiled. The property was operating during the two months ended September 30th, on which date it was closed down.

"Approximately 390 tons of tungsten metal (contained in addition agents, powders, wire, rod, etc.) were consumed in Canada in 1943. Three car lots of scheelite containing close to 48 tons of tungsten were imported from Mexico. Exports consisted of 254 tons of low-grade concentrates (containing 37 tons of WO_3) that were shipped to the United States for special treatment, chiefly to Salt Lake City.

"Atlas Steel Company, Welland, Ontario, is the only Canadian consumer of concentrate, but it takes scheelite concentrate only.

"World production of tungsten ore and concentrate in 1939, on a basis of 60 per cent WO_3 , was about 40,000 metric tons, the principal producers being China, Burma, United States, Bolivia, Malaya, Portugal, Korea, Japanese controlled areas in south China, Australia, and Argentina.

"China was the chief source of tungsten for 20 years prior to 1939, the record production being 16,257 metric tons of 60 per cent WO_3 in 1937. In 1941, however, only 9,000 tons were produced. About 95 per cent of the output has come from Kiangsi, Hunan, and Kwangtung provinces, about 70 per cent being from the Nanling region in Kiangsi province. The ore mainly occurs as wolframite. Most of the mines in Kiangsi are still under Chinese control.

"During 1943 custom ores and crude concentrates were treated by the Bureau of Mines, Ottawa; by the Quebec Department of Mines Plant, Val d'Or, Quebec; and by the War Metals Research Board, University of British Columbia, Vancouver. Ores are no longer being treated in the above plants, except by special arrangement.

"Tungsten ores are concentrated to 60 per cent or higher of tungsten trioxide (WO_3). For adding to steel, the ore is generally converted into ferro-tungsten, but sometimes into tungsten oxide, calcium tungstate, or tungsten powder. Canada has no plants for the manufacture of ferro-tungsten or other tungsten addition agents and the only company making tungsten steels is Atlas Steels, Welland, Ontario. Only scheelite is used by the Company at present and the high-grade concentrate (not less than 70 per cent WO_3) is added directly to the steel bath. This is possible because of the comparative ease with which the calcium forms a slag.

"Consumption of tungsten is largely dependent upon production of high speed alloy steels, but this production has declined considerably owing to the accumulation of stocks of bars and billets and to changes in the military program. As a result of this and because of the large supply of ferro-tungsten, concentrates, and scrap on hand, the Metals Controller, before the end of 1943, instructed all producers to discontinue their operations and to immediately ship the material on hand. He also gave notice that no new contracts to purchase would be made.

"The purchase price in the United States of domestic concentrate during 1943 was \$30 per short ton unit (20 pounds) of contained WO_3 in the standard concentrate, less freight and penalties below 60 per cent WO_3 and above impurities specifications. This price is to remain until April 30, 1944, and will then be \$24 a unit until June 30, 1944. Duty into the United States is 50 cents per pound of contained tungsten metal, but there is no duty on Canadian low-grade concentrates shipped for treatment. The United States price of 75 to 80 per cent ferro-tungsten is \$1.90 per pound of contained tungsten metal. The price of tungsten metal of 99 per cent purity is \$2.50 to \$2.75 a pound; and of 99.7 per cent purity, \$5.40 a pound.

"The price in Canada of scheelite concentrate containing 70 per cent WO_3 (within specifications) was \$26.50 a short unit of WO_3 , delivered at Welland, Ontario, this being equivalent to about \$1,855 a short ton of 70 per cent concentrate, delivered. All sales of Canadian concentrate were made through the Metals Controller, Ottawa."

Table 176.—Production (Commercial Shipments) of Crude Tungsten Concentrates in Canada

Year	Pounds	\$	Average per cent WO ₃
1912.....	28,000	(a)	72
1917.....	580	234	69.41
1918.....	(c) 27,000	11,700	73.8
1939.....	8,825	4,917	(a)
1940.....	12,002	7,303	70.75
1941.....	(b) 82,846	38,712	51.1
1942.....	520,981	406,275	61.8
1943.....	1,508,621	1,083,538	54.2

(a) Not recorded.

(b) Includes export of considerable low-grade material to U.S.A.

(c) Included 11 tons produced at Burnt Hill, N.B., with smaller shipments from Yukon, Nova Scotia and Manitoba.

Table 177.—Tungsten Consumed in Specified Industries, 1938-1943

Year	Tungsten wire used in manufacture of Canadian electrical apparatus and supplies	Ferro-tungsten consumed in Canada in the manufacture of steel (x)		Tungsten metal consumed in Canada in the manufacture of steel and alloys (x)
		Value \$	Long tons Value \$	
1938.....	50,594	30	69,806	.....
1939.....	52,207	95	173,250	13,089
1940.....	62,175	336	829,859	15,474
1941.....	82,696	482	1,003,314	29,729
1942.....	129,265	577	1,440,141	36,882
1943.....	93,862	491	1,721,967	23,000

(x) Other than tungsten-chromium.

Table 178.—Tungsten Mining in Canada, 1942 and 1943

	1942 *			1943 *		
	British Columbia	Other provinces	Canada	British Columbia (a)	Other provinces	Canada
Active firms.....No.	7	(†) 8	15	6	.....	6
Ore mined.....Ton	8,471	9,968	18,439	28,860	.....	28,860
Capital.....\$	712,434	87,872	800,306	1,982,640	.....	1,982,640
Employees—						
On salary.....No.	15	16	31	25	.....	25
Wage-earners.....No.	107	51	158	215	.....	215
Total.....No.	122	67	189	240	.....	240
Salaries and wages—						
Salaries.....\$	18,673	17,396	36,069	54,995	.....	54,995
Wages.....\$	183,935	69,724	253,659	476,878	.....	476,878
Total.....\$	202,608	87,120	289,728	531,873	.....	531,873
Fuel and electricity used.....\$	12,421	13,185	25,606	19,598	.....	19,598
Process supplies used.....\$	18,527	23,341	41,868	4,452	.....	4,452
Freight and smelter costs.....\$	3,473	874	4,347	2,655	.....	2,655

(*) Not including data relating to the production of tungsten concentrates at auriferous quartz (gold) mines.

(†) Includes 2 in Nova Scotia; 3 in Quebec; 2 in Manitoba and 1 in Northwest Territories.

NOTE.—Owing to the difficulty of obtaining accurate production data direct from certain of these mines, the statistics of Canadian tungsten production for 1942 were compiled largely from customs mills returns and represent the combined tungsten recoveries from both "straight" tungsten ores and auriferous quartz ores. Canadian tungsten production in 1942 as thus defined totalled 520,981 pounds of concentrates valued at \$406,275.

(a) Gross production of these mines in 1943 totalled \$992,260 and WO₃ content of ores shipped amounted to 522,460 pounds.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid and in the non-ferrous, glass, ceramic and color industries.

The United States Bureau of Mines reports that vanadium has been and is now being obtained by some countries from other than vanadium ores, including petroleum, bauxite, phosphate rock and titaniferous magnetites; the ever-increasing demand for vanadium directs attention to all possible vanadium sources, as well as to efforts to extend known deposits. In the United States the principal ores are roscoelite and carnotite in sandstones, disseminated or in spots, bunches, lenses and seams. Vanadium was among the metals included in the inventory control provided by General Metals Order 1, May 1, 1941, issued by the United States Office of Production Management.

Data relating to possible imports of vanadium ores or vanadium compounds or alloys are not shown separately in Canadian trade reports. In 1943 there were 204 tons of ferrovanadium valued at \$558,717 consumed in Canada in the manufacture of steel.

Vanadium ore was quoted August, 1944: 27½ cents per pound contained V_2O_5 , f.o.b. shipping point, by "E & M J Metal and Mineral Markets", New York.

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec.

Zircon is used to a steadily growing extent in refractories, specialized porcelains and heat-resisting glass. The United States Bureau of Mines Yearbook for 1941 reports on the metal as follows:

"Zircon is recovered from the beach sands near Melbourne, Florida, by the Riz Mineral Company, as an accessory of titanium ore and from the gravels near Lincoln, California, as a by product of gold dredging. Zirconium metal purifies, hardens, and strengthens steels and acts with aluminum to harden cupronickel. Metallic zirconium as powder or ductile metal is used in photoflash bulbs, radio tubes, ammunition primers and welding rods. In 1941 (January-September) there were 20,101 short tons of zirconium ore valued at \$446,286 imported into the United States; of these 73 per cent came from Australia, 24 per cent from Brazil and 3 per cent from British India. Canadian consumption of ferrozirconium in the manufacture of steel totalled 51 short tons valued at \$7,337 in 1943."

Zircon ore was quoted in August, 1944 by "E & M J Metal and Mineral Markets", New York: per ton f.o.b. Atlantic seaboard, minimum 55 per cent ZrO_2 , \$65 to \$75 nominal. Zirconium alloy, 12 to 15 per cent Zr, 39 to 43 per cent Si, \$102.50 to \$107.50 per gross ton; 35 to 40 per cent Zr, 47 to 52 per cent Si, 14 to 16 cents per pound.

Table 179.—Principal Statistics(x) of the Miscellaneous Metal Mining Industry in Canada, 1942 and 1943

	1942	1943
Number of firms.....	68	54
Number of plants.....	67	59
Capital employed (†)..... \$	3,956,427	15,603,307
Number of employees—On salary.....	191	277
On wages.....	1,161	1,687
Total.....	1,352	1,964
Salaries and wages—Salaries..... \$	286,932	600,684
Wages..... \$	2,109,799	3,694,469
Total..... \$	2,396,731	4,295,153
Value of production (gross)..... \$	5,516,241	9,062,368
Cost of fuel and electricity..... \$	623,665	1,059,552
Process supplies used..... \$	600,900	1,215,049
Smelter charges..... \$	33,910	2,759
Freight..... \$	261,211	263,513
Value of production (net)..... \$	3,996,555	6,521,495

(x) Does not include data relating to smelters and refineries or to mining in the Northwest Territories.

(†) Exclusive of ore reserves.

Table 179(A).—Capital Employed in the Miscellaneous Metals Mining Industry in Canada, 1943

Capital employed as represented by—	\$
Present cash value of the land (excluding minerals).....	4,809,832
Present value of buildings, fixtures, machinery, tools and other equipment.....	7,119,387
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	1,087,909
Inventory value of finished products on hand.....	635,938
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	1,950,241
Total.....	15,603,307

Table 180.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1943

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total.....	232	45	600,684
Wage-earners—			
Surface.....	982	23	3,694,469
Underground.....	492		
Mill.....	178	12	
Total.....	1,652	35	3,694,469
Grand Total.....	1,884	80	4,295,153

Table 181.—Average Number of Wage-Earners Employed, by Months, 1942 and 1943

Month	1942 Total	1943				
		Surface		Under- ground	Mill	
		Male	Female		Male	Female
January.....	783	949	12	530	154	
February.....	826	928	13	485	157	
March.....	858	978	13	475	150	
April.....	906	928	12	430	157	
May.....	911	957	14	451	165	23
June.....	1,024	1,036	15	511	197	14
July.....	1,152	1,081	17	525	207	19
August.....	1,232	1,095	34	552	200	19
September.....	1,344	1,004	35	460	207	22
October.....	1,463	931	37	480	198	22
November.....	1,602	930	34	521	189	20
December.....	1,678	825	24	475	175	5

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

The Non-Ferrous Smelting and Refining Industry, as defined by the Dominion Bureau of Statistics, Ottawa, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The net value added by the industry in the processing of crude or semi-crude material during 1943 totalled \$111,857,020 compared with \$125,881,047 in the preceding year. Refined products included gold, silver, nickel, copper, lead, zinc, aluminum, tin, magnesium, antimony, bismuth, cobalt, cadmium, selenium, tellurium, pitchblende products and sulphur; other end products of individual plants or companies were copper-nickel matte, copper matte, cobalt salts, nickel salts, nickel and cobalt oxides, arsenious oxide, sulphuric acid, platinum metals residues, zinc dust, zinc oxide, and blister and anode copper.

This value added in 1943 represents a 12.3 per cent decrease from the all time high record of \$125,881,047 in 1942. This does not altogether reflect a general decrease in metal output but rather the gradual increase in mining, smelting and transportation costs resulting from prolonged war-time conditions. The total costs of both foreign and domestic ores, concentrates, matte etc., treated in all Canadian non-ferrous metallurgical plants during 1943 was estimated at \$317,917,186 compared with \$258,903,818 in 1942. It should be noted, in a study of these data, that companies operating both mines and smelters may vary from year to year the nominal values of crude ores etc., shipped from their mines to their own smelters, with the result that in some years the mining industry proper is favoured economically at the expense of the non-ferrous smelting and refining industry and vice versa. The total annual net value of commodity production for the nation as a whole is, however, not affected by these arbitrary (internal) evaluations.

Fuels and purchased electricity consumed by the industry in 1943 totalled \$43,105,101 compared with \$35,748,639 in 1942. The value of chemicals and other process supplies consumed during the year under review amounted to \$38,334,069 as against \$27,083,695 in the preceding year.

Capital employed during 1943 by the non-ferrous smelting and refining industry was reported at \$392,217,159, which figure includes the value of land, plant, material on hand and in process, finished products and operating funds, the very great expansion in new plant construction and production since the commencement of the war may be realized in a comparison of this total with the corresponding figure of \$192,186,465 for 1939.

Employees during 1943 totalled 26,749 compared with 21,162 in 1942. Salaries and wages paid in 1943 amounted to \$48,491,732 as against \$37,340,556 in the preceding year. It is interesting to note that female wage-earners employed increased from an average of 185 in 1942 to 797 in 1943.

Table 182.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1941-1943

	1941	1942	1943†
Number of companies.....	9	10	9
Number of plants.....	13	15	16
Capital employed.....	\$ 309,963,342	356,052,965	392,217,159
Number of salaried employees.....	1,750	2,625	3,375
Salaries.....	\$ 4,117,398	5,286,755	7,160,290
Number of wage-earners.....	14,264	18,537	23,374
Wages.....	\$ 23,365,291	32,053,801	41,331,442
Value of plant products (gross) (x).....	\$ 379,322,270	447,617,199	511,213,376
Estimated cost of ores, concentrates, etc., treated (a).....	\$ 213,542,065	258,903,818	317,917,186
Cost of fuel and purchased electricity (b).....	\$ 26,771,800	35,748,639	43,105,101
Process supplies, other than items (a) and (b).....	\$ 19,272,162	27,083,695	38,334,069
Value added by smelting (net) (d).....	\$ 119,736,294	125,881,047	111,857,020

(x) The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industry (smelting, refining, etc.) end products (blister, copper matte, etc.) and in this sense represents a duplication in values.

(d) See preceding text.

(†) Data in this report for 1943 do not include those relating to the Eldorado Mining and Refining Ltd.

Table 183.—Capital Employed in the Non-Ferrous Smelting and Refining Industry in Canada, 1942

	\$
Present cash value of the land (excluding minerals).....	5,022,353
Present value of buildings, fixtures, machinery, tools and other equipment.....	256,201,613
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	46,333,042
Inventory value of finished products on hand.....	7,406,503
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	77,253,648
Total.....	392,217,159

Table 184.—Number of Wage-Earners, by Months, 1932 and 1939-1943

Month	1932	1939	1940	1941	1942		1943	
					Male	Female	Male	Female
January.....	5,496	11,138	11,225	12,927	15,778	31	22,322	522
February.....	5,400	11,123	11,297	13,052	16,298	32	23,120	560
March.....	5,355	11,334	11,298	13,102	16,434	34	23,089	653
April.....	4,750	11,371	11,403	13,617	16,617	39	22,788	727
May.....	4,297	11,380	11,691	14,275	17,223	53	22,552	773
June.....	4,475	11,390	11,794	14,503	18,297	68	22,968	843
July.....	4,205	11,486	12,102	14,634	18,900	75	22,785	886
August.....	4,160	11,476	12,256	14,788	19,346	81	22,538	917
September.....	4,198	11,454	12,251	14,815	19,091	206	22,186	943
October.....	4,326	11,327	12,316	14,995	20,076	424	21,856	938
November.....	4,316	11,401	12,481	15,055	20,953	570	22,337	904
December.....	4,274	11,424	12,771	15,371	21,239	605	22,393	903
Average.....	4,604	11,360	11,908	14,264	18,352	185	22,577	797

The agreement made in 1939 by the large base metal producers and the Imperial Government, by which the producers were to supply the Imperial Government with copper, lead and zinc at prices which prevailed shortly before the outbreak of the war, was continued with some adjustments or revisions for increases in prices due to the increased cost of labour and materials. Canada can now furnish large quantities of these metals in the refined state, whereas in 1914 no refined copper, nickel or zinc and only a comparatively small amount of refined lead were produced in this country.

Tables of world metal production were omitted from this report due to the fact that recent data for most countries were unobtainable or conjectural in nature; also, data relating to capacities of Canadian metallurgical plants have been withheld for confidential use only until the termination of the war.

The following information has been abstracted from the 1943 annual reports of some of Canada's more important mining and metallurgical companies:

Canadian Copper Refiners Limited—Montreal East—Quebec.—"Except for a short period at the beginning of the year, the refinery continued to operate at full capacity during 1943. A new building for the production of selenium compounds and the housing of a new Research Laboratory is under construction. Sales of selenium and selenium compounds increased considerably. This expansion has been accelerated by war demand and research, resulting in finding new uses for this metal. In April 1944 it was hoped that work might start soon on a plant for the production of copper sulphate. Canada is presently dependent upon Great Britain and the United States for its supply of copper sulphate, which is essential in agriculture, base metal production, the processing of pulp and paper and in numerous other fields."

Noranda Mines Limited—Noranda, Quebec.—"During 1943, the smelter treated 1,380,738 tons of ore, concentrate and slag, including 428,073 tons of custom ores and concentrates, and produced 137,466,885 pounds of anodes. After deducting the copper, gold and silver which was recovered from slags received from various shippers, the estimated production of new metals was 132,762,100 pounds of fine copper, 333,261 ounces of gold and 1,516,506 ounces of silver. The estimated recovery from Horne mine ore and concentrate was 66,164,400 pounds

of copper, 269,732 ounces of gold and 660,780 ounces of silver. During the year under review the concentrator treated 1,090,166 tons of ore from the Horne mine, from which 187,862 tons of copper-gold concentrate were produced and sent to the smelter. The cyanide mill treated 210,205 tons of pyrite from the flotation circuit tailing, from which 14,430 ounces of gold were recovered. 186,633 tons of pyrite were recovered from the cyanide mill tailing and sold to chemical plants."

Aluminum Company of Canada Limited.—"The ore plant producing bauxite concentrates was in continuous operation at Arvida, Quebec, throughout 1943. Aluminum ingots were produced during the year under review at Arvida, Shawinigan Falls, La Tuque, Beauharnois and Isle Maligne, all in the Province of Quebec. The Beauharnois and Isle Maligne plants are new, coming into production for the first time in 1943. Production of aluminum in all plants of the company during 1943 totalled 991,499,296 pounds or an increase of 498 per cent over the output of 165,680,869 pounds in 1939. Canada is now firmly established as one of the world's greatest producers of aluminum a fact largely attributable to the immense water power resources of the Dominion."

International Nickel Company of Canada Limited.—"Since the outbreak of war in 1939, the objective of this company has been to meet effectively the wartime requirements of the governments in Ottawa, London and Washington. We have striven to provide the maximum supply of nickel and nickel products, copper and platinum metals and through our technical knowledge of uses to assist in directing the supplies into those fields of application where they would be of greatest value.

"Our central effort has been to expand the supplies of nickel. Deliveries of nickel in all forms derived from our own mine production amounted in 1943 to 265,000,000 pounds, representing an increase of 55,000,000 pounds over 1939. In order to provide this enlarged supply, the tonnage of our ore mined was forced from 7,273,000 tons in 1939 to 12,105,000 tons in 1943. Had it not been for shortage of man-power during the last six months of the year the production would have been appreciably higher. As an emergency war measure we have also refined a volume of nickel originating from the mines of others. Our own deliveries, together with this volume refined for others, totalled nearly 300,000,000 pounds.

"The company's output of copper has been subordinated to the war needs for expanded nickel production. Deliveries of our copper in all forms amounted to 265,000,000 pounds, comparable with 331,000,000 pounds in 1939. Our own deliveries, together with the volume of copper which we refined for others, totalled nearly 316,000,000 pounds. Deliveries of platinum metals reached the highest level in the company's history. Deliveries of gold and silver amounted to 58,331 ounces and 1,768,052 ounces respectively and of selenium and tellurium 80,984 pounds and 6,779 pounds respectively. During the war the technical and operating resources of the company have been devoted also to the production of a variety of special war material."

Deloro Smelting and Refining Co., Ltd., Deloro, Ontario.—"the plant of the company located at Deloro, Ontario was in continuous operation throughout 1943. No Canadian silver-cobalt ores were smelted during the year, however the company treated a considerable tonnage of cobaltiferous residues received from Africa. Products in 1943 included cobalt metal, cobalt oxide, cobalt salts and cobalt alloys. A relatively large quantity of refined arsenic was produced in 1943 from crude arsenic obtained from gold mines in the Province of Quebec."

Eldorado Mining and Refining Limited—Port Hope, Ontario.—"War-time restrictions prevent the publication of data relating to the production of pitchblende products in this plant."

Falconbridge Nickel Mines Limited.—"Operation in 1943 of the treatment plants at Falconbridge in the Sudbury area of Ontario was satisfactory throughout the year. For the first quarter the operation followed the same pattern as for the preceding year. However, during the remainder of the year, a marked improvement in metallurgical efficiency was experienced due to the greater flexibility afforded by increased smelting capacity. The result is shown by a comparison of the last nine months of the year with a like period in 1942, which indicates that, while tonnage treated increased but little over 5 per cent the production was about 11 per cent higher with no change in grade of ore. After deducting 326 tons of waste picked, and applying adjustments in above-ground storage there were 807,048 tons of ore treated comprising 514,724 tons of milling grade and 292,324 tons of smelting grade; matte

produced totalled 22,699.4 short tons containing 11,597.4 short tons of nickel and 6,046.6 short tons of copper metals, recovered per ton treated totalled 28.74 pounds nickel and 14.98 pounds of copper. Falconbridge matte is shipped to the Canadian plants of the International Nickel Company of Canada Limited."

Dominion Magnesium Limited.—"The plant of this company located at Haley near Renfrew, Ontario was in continuous operation during the entire year. Products included both magnesium ingots and magnesium alloys. The metal is recovered from dolomite rock by the ferrosilicon process. The average number of employees during the year totalled 408 of whom 25 were females."

Hudson Bay Mining and Smelting Co. Limited—Flin Flon, Manitoba.—"The tonnage of ore milled and the production of blister copper and slab zinc were the highest for any year on record while the production of gold and silver was only exceeded in 1942. Cadmium production was the highest it has been in any year since stockpiles of residues were depleted and production depended solely on treatment of current zinc purification residue. The tonnage of ore mined and hoisted from underground totalled 2,258,638 assaying 0.113 ounces gold; 1.88 ounces silver; 2.44 per cent copper and 5.5 per cent zinc. Included in the above were 18,441 tons of direct smelting ore. From 2,241,142 tons of ore milled there were produced 415,810 tons copper concentrates assaying 0.407 ounces gold; 7.28 ounces silver and 11.53 per cent copper and 180,970 tons of zinc concentrates assaying 0.068 ounces gold; 1.71 ounces silver; 0.46 per cent copper and 46.1 per cent zinc. The average percentage of recovery of copper in copper concentrates and the average percentage of recovery of zinc in the zinc concentrates during 1943 were the highest on record. The tonnage of flotation tailings treated in the cyanide plant during 1943 was 1,589,713 from which were recovered 22,119 ounces gold, 225,388 ounces silver and 79,999 pounds copper; this material was sent to the copper converter and included in the blister copper produced in the smelter. In 1943 the company produced 108,498,410 pounds of slab zinc. After allowing for metals due on account of custom concentrates the company shipped in 1943 for its own account 192,884 ounces gold, 3,127,331 ounces silver, 92,357,369 pounds copper and 141,733 pounds of selenium.

"The average number of employees at Flin Flon during 1943 was 2,217. The labour shortage was such during the middle of the year that most underground development work had to be discontinued and construction work curtailed. Temporary employees from the farms relieved the situation for the winter. Each year recently has seen an increase in the number of women employees, and at the end of the past year there were 220 on the payroll. There are only one-third of the employees now working who were with the company at the beginning of the war."

Consolidated Mining and Smelting Company of Canada Limited—Trail, B.C.—"Compared with 1942, the production of refined metal from Trail plants showed a substantial reduction due to the falling off in ore receipts from the Sullivan mine. Production costs increased due to lower output and the shortage of experienced men. For these reasons, the metallurgical recoveries were slightly lower. The accident record showed some improvement over 1942, the shifts lost per one thousand worked being 5.7.

"Production of refined lead was 224,493 tons or about 19,000 tons less than in 1942. The zinc plant produced 152,299 tons of bar zinc, or about 13,000 tons less than in 1942. The antimony plant was closed from the first of the year until the middle of June due to shortage of labour; consequently the year's production of antimony was only 557 tons. The sulphur plant was closed in July as the maximum output of sulphuric acid was required for fertilizers. The production of sulphuric acid at 269,394 tons was 76,000 tons above the previous record in 1942.

"In March 1943 the production of ore from the Sullivan mine reached a record high of 243,631 tons. The tonnage decreased steadily until October when the mine produced only 170,282 tons of ore. The decline in production was chiefly due to shortage of labour. This shortage affected the rate of ore extraction and caused development work to lag behind production. For the first time in some years development work was insufficient to maintain ore reserves, 1,600,000 more tons being mined than were actually developed during the year. Shipments of iron concentrates for the production sulphuric acid at Trail were commenced from the mine in September.

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada.

The Coke and Gas Industry in Canada.

The Peat Industry in Canada is included under non-metals, chapter 8.

The Petroleum Industry in Canada.

1. Production of Crude Petroleum.
2. Production of Petroleum Products.

NOTE:—In order to correlate data regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, and petroleum industries. This survey presents information regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

The Bureau issues an annual report on Coal Statistics for Canada which may be referred to for complete details of the Coal Mining Industry.

THE COAL MINING INDUSTRY

Dominion Fuel Board—The Board was created in 1922 to meet the need for a permanent organization responsible to the Government for a thorough and systematic study of the fuel situation and recurrent shortages experienced throughout Canada. It is composed of permanent members of the Dominion Civil Service and the staff of the Board constitutes a division of the Bureau of Mines and Geology, Department of Mines and Resources.

In recent years the policy of the Government has been to extend the market for Canadian coal and to that end financial assistance in the form of subventions has been given to the coal industry since 1928, the Board being responsible for the administration of subvention payments. The amount of coal moved under these assisted rates increased from 146,126 short tons in 1928 to a maximum of 3,403,581 short tons in 1939 and was 1,091,887 net short tons in 1943. Of the total moved under assisted rates in 1943, 809,161 short tons were from Nova Scotia and New Brunswick and 282,726 short tons from Western Canada.

The Dominion Fuel Board also administers the Domestic Fuel Act (17 Geo. V, c. 52) authorizing a bonus on Canadian coal converted to coke and sold for domestic use, and, from April 1, 1941, the Act (20-21 Geo. V, c. 6) to place Canadian coal used in the manufacture of coke for metallurgical purposes upon a basis of equality with imported coal.

Coal Administration—Since the outbreak of war, the Dominion Fuel Board has collaborated closely with the Coal Administrator of the Wartime Prices and Trade Board, and on Aug. 6, 1941, the Coal Administrator took over, for the duration of the War and until further order, the powers, duties, functions, staff and establishment of the fuel Board.

In December, 1942, P.C. 10674 was passed establishing the Emergency Coal Production Board. On this Board the Coal Administrator acted as Chairman.

Coal Control.—Order-in-Council P.C. 1752 of March 5, 1943, transferred the Coal Administration from the Wartime Prices and Trade Board, Department of Finance, to the Department of Munitions and Supply and the Coal Control was created. The duties and functions of the Coal Control in general are to study the production and importation of coal into Canada and to maintain an equitable distribution thereof; to regulate and maintain price control and prevent infractions of the price ceilings, and to carry on the powers and duties of the Dominion Fuel Board.

The Emergency Coal Production Board formerly under Department of Finance also was transferred to Department of Munitions and Supply, by Order-in-Council 1752, dated March 5, 1943. During 1943 the Emergency Coal Production Board actively assisted coal mine operators where necessary in maintaining and increasing production, either through production subsidy or by financial assistance in the form of loans or grants. Also initiated and financed by the Board were six stripping operations in Alberta which were to provide a reserve to meet emergencies. It was also instrumental in the re-opening of a large stripping operation in southern British Columbia.

The Board, in co-operation with the Department of Mines in Quebec, assisted in developing small local peat fuel production operations in various parts of the Province, and assisted them financially.

Expenditures for these purposes since the inception of the Board up to the end of 1943, amounted to \$4,624,908.

The fuel situation in Canada is somewhat anomalous, as, in spite of the enormous resources of coal in the country, about 50 per cent of the requirements is imported. The Canadian coal areas are situated in the eastern and western provinces, while the areas of densest population and greatest industrial development, in Ontario and Quebec, are more easily and economically supplied with coal from the nearer coalfields of Pennsylvania and Ohio.

Canadian coal exported in 1943 amounted to 1,110,101 tons, compared with 815,585 tons in 1942. Ports in Nova Scotia, New Brunswick, Quebec and central Ontario cleared 496,962 tons of Canadian coal and exportations through western ports reached 613,139 tons.

Imports of coal into Canada in 1943 totalled 28,852,654 tons. Anthracite imports amounted to 4,458,519 tons of which 4,073,731 tons came from the United States and 384,788 tons from Great Britain. Receipts of bituminous coal totalled 24,393,798 tons and lignite coal imported amounted to 337 tons.

Production of coal in Canada in 1943 totalled 17,859,057 tons valued at \$62,877,549 as compared with 18,865,030 tons worth \$62,897,581 in 1942. Output in 1942 established an all-time high record. Of the total Canadian output in 1943, Nova Scotia miners contributed 6,103,085 tons; New Brunswick 372,873 tons; Manitoba 999 tons; Saskatchewan 1,665,972 tons; Alberta 7,676,726 tons; and British Columbia 2,039,402 tons. The entire coal mining industry of Canada provided employment for 26,473 persons and distributed \$47,291,919 as salaries and wages.

The rough average British Thermal Unit values per pound of Canadian coals delivered to consumers (1941) was estimated by the Department of Mines and Resources, Ottawa, as follows:—Bituminous—Maritime Provinces, British Columbia and Alberta, grade 1—14,000; grade 2, 13,000 and grade 3, 11,000 to 12,000. Sub-bituminous—Alberta and British Columbia, 10,000 to 11,500. Lignite—Domestic, Alberta and British Columbia, 7,500 to 10,000. Lignite—Saskatchewan, 6,500 to 7,500.

Nova Scotia produces bituminous coal from Cape Breton Island and the mainland collieries in the Cumberland and Pictou areas. New Brunswick produces at Minto a small portion of the bituminous coal of Eastern Canada. Lignite is produced in Saskatchewan, the main producing areas being the Bienfait and Estevan divisions.

Alberta produces all ranks of coal, including sometimes a small tonnage of anthracite coal. Bituminous coal is produced in the Crownsnest field and the mining areas of the foothills. The coal mined in the central area of the province is lower in rank and is classed as sub-bituminous and lignite.

British Columbia produces bituminous and sub-bituminous coal from Vancouver Island, the Crow's Nest area, which is adjacent to the Alberta field, and also from the inland area located near the towns of Princeton and Merritt.

Table 185.—Capital Employed in the Coal Mines of Canada, by Provinces, 1942 and 1943

Province	1942				1943			
	Capital employed as represented by:				Capital employed as represented by:			
	Cost of land, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total	Cost of land, buildings, machinery and tools	Cost of supplies and stocks on hand	Cash, trading and operating accounts and bills receivable	Total
Nova Scotia.....	\$ 31,838,558	\$ 2,964,078	\$ 10,034,232	\$ 44,836,868	\$ 30,608,710	\$ 4,006,737	\$ 12,091,633	\$ 46,707,080
New Brunswick...	\$49,795	46,722	489,914	1,386,429	790,466	47,997	541,018	1,379,481
Manitoba.....	2,590	100	500	3,100	2,500	100	500	3,100
Saskatchewan.....	2,718,086	136,398	428,553	3,283,037	2,921,133	160,422	521,740	3,612,295
Alberta.....	28,946,513	1,165,947	7,327,893	37,438,483	28,258,501	1,448,085	7,774,030	37,480,616
British Columbia..	20,015,265	372,650	1,400,865	21,818,780	20,907,183	529,096	1,248,185	22,684,464
Canada.....	84,399,745	4,684,995	19,681,937	108,766,697	83,488,433	6,201,437	22,177,106	111,867,036

Table 186.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces 1943

Province	Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Surface	Under-ground				
						\$	\$	\$
Nova Sooria.....	473	138	2,083	9,814	12,508	1,222,807	22,603,104	23,825,911
New Brunswick.....	39	10	328	636	1,013	101,711	1,150,857	1,252,568
Manitoba.....			1	2	3		1,833	1,833
Saskatchewan.....	53	10	331	392	786	114,053	967,902	1,081,955
Alberta.....	569	63	2,380	6,151	9,163	1,448,993	14,600,364	16,049,357
British Columbia.....	225	27	790	1,958	3,000	615,212	4,465,083	5,080,295
Canada 1943.....	1,359	248	5,913	18,953	26,473	3,502,776	43,789,143	47,291,919
Canada 1942.....	1,223	208	5,536	19,227	26,194	3,141,599	38,949,538	42,091,137

Table 187.—Wage-earners Employed and Days' Work Done, by Months, in the Coal Mines of Canada, 1943, with Comparative Totals for 1942

Month	Number of wage-earners			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	5,850	19,721	25,571	141,040	430,071	571,111
February.....	5,877	19,471	25,348	137,368	422,192	559,560
March.....	5,767	19,191	24,958	149,756	467,138	616,894
April.....	5,428	18,085	23,513	131,104	393,920	525,024
May.....	5,370	17,584	22,954	131,214	380,457	511,671
June.....	5,613	17,631	23,244	138,356	383,844	522,200
July.....	5,707	17,885	23,592	141,524	400,743	542,267
August.....	5,874	18,922	24,066	144,289	402,283	546,572
September.....	6,008	19,033	25,041	145,520	404,297	549,817
October.....	6,253	19,588	25,841	149,971	432,347	582,318
November.....	6,541	20,410	26,951	144,040	409,567	553,607
December.....	6,666	20,649	27,315	157,585	440,930	598,515
Total for 1943.....				1,711,767	4,967,789	6,679,556
Total for 1942.....				1,617,660	5,131,912	6,749,572

Table 188.—Output of Coal in Canada, by Grades, 1918-1943

Calendar year	Anthracite		Bituminous		Sub-Bituminous*		Lignite		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$		\$		\$
1918.....	115,405		11,636,190				3,226,331		14,977,926	55,192,896
1919.....	85,579		10,892,046				2,941,471		13,919,096	55,622,670
1920.....	127,513		13,122,924				3,096,327		16,946,761	82,496,538
1921.....	96,964	330,699	11,680,477	58,848,444			3,280,052	13,272,513	15,057,493	72,151,656
1922.....	40,417	122,538	11,630,488	53,348,507			3,486,526	12,047,452	15,157,431	65,518,497
1923.....	107	322	12,941,877	58,478,070	466,492	1,399,424	3,582,005	12,180,570	16,990,571	72,058,986
1924.....			9,483,732	40,662,894	590,168	1,761,086	3,564,297	11,170,008	13,638,197	53,533,988
1925.....			8,939,607	36,793,501	570,654	1,731,267	3,624,707	10,737,183	13,134,968	49,261,951
1926.....			12,393,079	48,153,572	489,736	1,458,116	3,595,316	10,263,406	16,478,131	59,875,094
1927.....			13,006,966	49,385,818	596,155	1,784,973	3,823,710	10,996,672	17,426,861	61,867,163
1928.....			12,971,744	50,584,108	740,496	2,076,212	3,852,053	11,097,513	17,561,293	63,757,833
1929.....			12,850,822	49,965,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170
1930.....			10,824,839	41,789,051	603,358	1,705,236	3,453,127	9,355,451	11,881,324	52,849,748
1931.....			8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,765	12,243,211	41,297,695
1932.....			7,714,279	28,073,744	560,902	1,329,316	3,453,732	7,714,635	11,738,913	37,117,695
1933.....			7,970,288	27,757,150	554,118	1,274,017	3,369,943	6,892,795	11,903,344	35,923,962
1934.....			10,058,782	34,356,274	537,508	1,256,936	3,213,903	6,432,732	13,104,193	42,045,942
1935.....			9,748,841	33,150,781	566,425	1,410,926	3,572,740	7,401,403	13,888,006	41,963,110
1936.....			10,766,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,182	45,791,934
1937.....			11,634,379	39,661,259	506,260	1,314,196	3,695,315	7,776,593	15,835,954	48,752,048
1938.....			10,329,782	35,403,781	488,915	1,263,131	3,476,021	7,309,259	14,291,748	43,982,171
1939.....			11,769,296	40,119,905	512,101	1,328,401	3,411,301	7,233,684	15,692,698	48,676,900
1940.....			13,338,037	45,350,950	598,680	1,569,771	3,635,161	7,755,123	17,566,881	54,675,844
1941.....			13,603,307	47,391,274	585,453	1,593,549	4,037,161	9,074,807	18,235,921	58,059,630
1942.....			13,616,215	49,730,504	733,547	2,100,889	4,815,268	11,066,188	18,865,030	62,897,581
1943.....			11,985,253	47,353,853	792,252	2,399,289	5,081,552	13,124,407	17,959,057	62,877,549

* Not separately reported prior to 1923.

Table 189.—Output and Value of Coal in Canada, by Kinds and Provinces, 1942 and 1943

(Short tons)

Province	1942			1943		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	36	7,204,852	29,116,118	40	6,103,085	27,121,861
NEW BRUNSWICK (Bituminous).....	36	435,203	1,826,403	39	372,873	1,641,069
MANITOBA (Lignite).....	1	1,265	3,763	1	999	2,964
SASKATCHEWAN (Lignite)*.....	82	1,301,116	1,760,065	80	1,665,972	2,432,249
ALBERTA—						
Bituminous.....	15	3,807,619	11,221,161	14	3,469,898	10,942,203
Sub-bituminous.....	13	733,547	2,100,889	12	792,252	2,399,289
Lignite.....	164	3,212,887	9,302,360	159	3,414,581	10,689,194
Total†.....	192	7,754,053	22,624,410	185	7,676,726	24,030,686
BRITISH COLUMBIA (Bituminous).....	29	2,168,541	7,566,822	30	2,039,402	7,648,720
CANADA—						
Bituminous.....	116	13,616,215	49,730,504	123	11,985,253	47,353,853
Sub-bituminous.....	13	733,547	2,100,889	12	792,252	2,399,289
Lignite.....	247	4,515,268	11,066,188	240	5,081,552	13,124,407
Total.....	376	18,865,030	62,897,581	375	17,859,057	62,877,549

* Exclusive of 30 small mines in operation during part of 1942 and 19 small mines operating during part of 1943.

† Exclusive of 13 small mines operated under special permits in 1942 and 19 small mines in 1943.

THE COKE AND MANUFACTURED GAS INDUSTRY, 1943

Production from coke plants and from illuminating and fuel gas plants in Canada during 1943 was valued at \$60,900,598. This output was 9.2 per cent above the \$55,788,491 of the previous year and set a new record for the industry. Output for the year under review included 3,551,773 tons of coke valued at \$31,339,978 at the works, 74,731,346 M cubic feet of gas of which 74,736,078 M cubic feet valued at \$24,982,378 were sold or used, and by-products valued at \$4,578,242.

Thirty coke and gas works operated in 1943, including 11 by-product and bee-hive plant, 18 retort coal and water gas plants and 1 propane gas plant. Fifteen of these works were located in Ontario, 4 in British Columbia, 5 in Quebec, 2 in Manitoba, 2 in Nova Scotia, 2 in New Brunswick and 1 in Alberta. In addition to these producers, 1 company in Quebec and 2 in Ontario purchased coke-oven gas and distributed it for domestic or commercial use and data covering their operations have been included to round out the figures for the industry.

Output of coke from gas retorts, by-products and bee-hive ovens totalled 3,551,773 tons in 1943 compared with 3,265,549 tons in 1942 and 3,145,715 tons in 1941. By-product and bee-hive ovens produced 3,243,747 tons of coke in 1943 and gas retorts made 308,026 tons. In addition, 81,775 tons of petroleum coke were recovered in petroleum refineries and 17,995 tons of pitch coke in coal tar distillation plants.

Data on the distribution of coke (except petroleum and pitch coke) by the producers show that 153,349 tons were sold direct to domestic consumers; 1,706,520 tons were used in associated works operated by the producing companies; 338,472 tons were used by coke plants as fuel or

to make water gas; 660,979 tons were sold direct to consumers for foundry and other uses (other than domestic); 772,063 tons were sold to dealers for resale, and 44,954 tons were sold for export. The total distribution was 3,676,337 tons, including imports by the producers of 116,000 tons. Total stocks of coke in the hands of producers amounted to 218,790 tons at the end of 1943.

Imports into Canada of coke made from coal increased to 920,955 tons in 1943 from 719,910 tons in 1942, and exports increased to 44,954 tons from 44,764 tons. Imports of petroleum coke during this period rose to 334,830 tons from 312,917 tons and exports (including re-exports of imported coke) increased to 56,671 tons from 53,080 tons.

Manufactured gas, sold and used, amounted to 74,736,078 M cubic feet in 1943, including 55,904,976 M cubic feet from by-product ovens and 18,831,102 M cubic feet from gas plants. Sales of gas by the producers totalled 20,403,544 M cubic feet, of which 11,763,455 M cubic feet were from by-product ovens and 8,640,089 M cubic feet were from gas works. Most of the remaining gas was used as fuel in the producing plants or in their associated metallurgical works. These figures do not include 55,361 M cubic feet of (Pintsch) oil gas for lighting railway cars, 10,086,340 M cubic feet of still gas recovered at petroleum refineries, nor iron blast furnace gas and some producer gas which was recovered and used by the producers but for which no records are available.

The number of customers served with manufactured illuminating and fuel gas in 1943 was 513,098, the number of active meters was 535,727, the length of distributing mains was 3,968 miles, and the average calorific value of the gas sold ranged from 450-570 B.T.U. per cubic foot.

Table 190.—Materials Used in Coke and Gas Plants, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Bituminous coal carbonized in ovens or retorts—					
(a) Canadian.....	tons	1,487,994	6,835,656	1,227,015	5,702,774
(b) Imported.....	tons	2,979,867	17,617,276	3,548,484	23,201,694
Bituminous coal for making water gas—					
Imported.....	tons	4,030	35,985	5,104	47,412
Coke for gas-making—					
(a) Purchased.....	tons	9,356	97,281	11,322	124,853
(b) Companies' own make.....	tons	128,777	1,104,075	169,433	1,466,064
Oil used for enriching water gas.....	Imp. gals.	7,772,275	593,015	9,905,667	786,053
Absorbing and wash oil.....	Imp. gals.	276,019	36,317	289,869	39,864
Caustic soda.....	lb.	2,014,886	39,042	1,636,645	34,092
Lime.....	tons	2,517	27,427	2,189	23,896
Water.....			24,325		34,790
Iron oxide.....	tons	4,600	33,790	6,568	45,946
Sulphuric acid, 66° bé.....	lb.	64,114,815	493,332	62,203,340	460,311
All other materials.....			356,984		466,913
Total Cost.....			27,294,565		23,434,667

Table 191.—Products Made in Coke and Gas Plants, 1942 and 1943

Product	Unit of measure	1942		1943	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
GAS MADE—					
Retort coal gas.....	M. cu. ft.	5,131,152		5,069,024	
Coke oven gas.....	M. cu. ft.	43,228,790		44,137,447	
Producer gas.....	M. cu. ft.	16,171,807		20,354,129	
Water gas.....	M. cu. ft.	4,248,453		5,070,328	
Propane gas.....	M. cu. ft.	59,090		100,418	
Total Gas Made.....	M cu. ft.	68,839,292		71,731,345	
GAS SOLD OR USED—					
Gas sold.....	M cu. ft.	18,913,230	17,316,135	20,403,544	18,609,364
Gas used in own coke or gas plants.....	M cu. ft.	25,212,211	3,405,110	29,317,493	3,560,416
Gas used in associated metallurgical works.....	M cu. ft.	21,840,825	1,837,253	23,173,827	1,879,389
Gas otherwise accounted for but not sold.....	M cu. ft.	340,132	81,409	272,993	55,864
Gas not accounted for.....	M cu. ft.	1,449,551	826,134	1,569,311	877,345
Total Gas Sold or Used.....	M cu. ft.	67,755,949	23,466,041	71,736,078	21,982,378
COKE MADE—					
Coke from by-product or bee-hive ovens.....	ton	2,795,658	24,234,665	2,986,567	27,906,033
Coke from gas retorts.....	ton	234,314	2,668,673	273,202	2,425,215
Coke breeze from by-product ovens.....	ton	171,325	719,400	257,180	935,387
Coke breeze from gas retorts.....	ton	14,252	38,935	34,824	73,343
Total Coke.....	ton	3,265,549	27,711,673	3,551,773	31,333,978
OTHER PRODUCTS—					
Tar.....	Imp. gal.	32,286,913	1,994,224	35,534,397	2,126,163
Ammonia liquor.....	lb. NH ₃	1,713,085	18,079	1,701,108	17,155
Ammonium sulphate.....	pound	72,398,424	1,055,868	65,814,880	962,704
Benzol.....	Imp. gal.	5,999,085	797,257	5,823,478	818,656
Toluol, xylol and naphthalene.....	Imp. gal.	2,004,006	708,949	1,741,321	610,452
All other products.....			36,400		43,112
Grand Total.....			55,788,491		60,900,598

THE NATURAL GAS INDUSTRY

The Bureau of Mines, Ottawa, reviewed the Natural Gas Industry in 1943 as follows:

"Natural gas has been found in most of the provinces of Canada. It is produced commercially in abundance in Alberta and Ontario, and in smaller quantities in New Brunswick, Saskatchewan, and Quebec.

"In Alberta, most of the production comes from the Turner Valley field, which supplies fuel for the field itself, and feeds the pipe line to the cities and districts of Calgary and Lethbridge. It has been unnecessary to drill gas wells in this field for some years, and production is now largely derived from the petroleum wells, in which the gas plays a vital role in the production of petroleum. The 'gas-oil ratio' of many of these oil wells, particularly in the southern part of the field, where effective measures of conservation began to be applied comparatively late in their life, has risen so much that in some cases the wells have had to be re-classified as gas wells, thus, augmenting the reserve of gas. Production of gas still remained considerably in excess of consumption, although the waste was further reduced about 12 per cent. The experiment in re-cycling of gas, using Foundation well as the input well, was continued throughout the year, the wells drawn upon being mainly Frontier and Prairie. The amount so returned to the limestone, 116,728 m.c.f., was not included in the production. No information is available as to the results achieved in this experiment.

"The Edmonton area is supplied from the gas field at Viking about 80 miles southeast of the city, supplemented by the field at Kinsella farther east, discovered in 1929 but first connected by an extension of the pipe line in the fall of 1940. Kinsella is now the principal source; seven wells were drilled and production there was nearly three times the volume of gas produced at Viking. In December six wells were producing at Viking and fourteen at Kinsella.

"In December, 34 wells were producing in the Medicine Hat area and 12 in the Redcliff area. Two wells were drilled at Medicine Hat and production increased about 10 per cent. At Vermilion, consumption increased 50 per cent, at Wainwright about two per cent; the former draws its supply from the field of the same name, the latter from Fabyan. Among other producers the more important were Foremost and Brooks.

"A small production, 1500 m.c.f., was recorded in the Northwest Territories. In Saskatchewan, the eastern part of the Lloydminster field supplies the town of Lloydminster. In the Kamsack area fifteen shallow wells were drilled, ten of the earlier wells are connected to the town and six more remained unconnected. These wells are mostly around 200 feet in depth and yield from 15 to 250 m.c.f. at a closed-in pressure of 36 lbs. Throughout the province geophysical and geological work was again active with a view to the discovery of both gas and petroleum. Decisive results from a number of deep tests have not yet been obtained.

"In Ontario, although no striking new development occurred, a small new area of Guelph gas was brought into production in Zone township. Drilling continued in Haldimand county, where a number of small producers were obtained, particularly in Walpole, Oneida, and North and South Cayuga townships, as well as in Norfolk county, notably in Woodhouse and Townsend townships, and in Welland county, where Bertie township was the main producer. The test in Lake Erie about 5,900 feet off shore from Romney township got gas from the Lower Salina and Upper Guelph in an attempt to extend Tilbury East field. The deep test to the Trenton in Romney township was unsuccessful, as were also several wells in South Norwich and Westminster townships.

"In Quebec, natural gas is produced in small quantities at several shallow wells along the St. Lawrence River and is used locally.

"In New Brunswick, the Stoney Creek field continued to supply Moncton and Hillsborough and certain localities in Albert and Westmorland counties with natural gas. Six new wells were drilled and one was deepened. Flush production of the new wells amounted to 3,730 m.c.f."

Table 192.—Production of Natural Gas in Canada, by Provinces, 1934-1943

Year	New Brunswick		Ontario		Manitoba		Alberta	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$
1934	623,601	306,005	7,682,851	4,741,368	600	180	14,841,491	3,707,276
1935	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436
1936	606,246	298,819	10,036,743	6,052,294	600	180	17,407,820	4,376,720
1937	576,671	283,922	10,746,334	6,588,798	600	180	20,955,506	4,766,437
1938	577,492	284,689	10,952,806	6,460,764	600	180	21,822,108	4,807,346
1939	606,382	292,403	11,966,581	7,261,928	600	180	22,513,660	4,915,821
1940	616,041	300,543	13,053,403	7,745,834	600	180	27,459,808	4,923,460
1941	653,542	317,437	11,828,703	7,140,130			30,935,440	5,175,364
1942	619,380	299,688	10,476,770	6,809,901			34,482,585	6,146,146
1943	675,029	327,787	7,914,408	6,543,913			35,569,078	6,241,815

Year	Saskatchewan		Northwest Territories		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$
1934	13,781	4,823			23,162,321	8,759,652
1935	75,558	7,555			24,910,786	9,363,141
1936	90,839	33,985	1,100	245	28,113,348	10,762,243
1937	100,380	35,130	1,500	335	32,380,991	11,674,892
1938	90,285	34,136	1,500	335	33,444,791	11,587,450
1939	96,423	36,640	1,500	335	35,185,146	12,507,307
1940	100,773	30,232	1,500	335	41,232,125	13,000,593
1941	106,168	31,850	1,500	335	43,495,353	12,665,116
1942	117,124	45,585	1,500	335	45,697,359	13,301,655
1943	116,201	45,568	1,500	335	44,276,216	13,159,418

DOMINION BUREAU OF STATISTICS

Table 193.—Production of Natural Gas in Canada, by Months, 1943

	New Brunswick	Ontario	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	86,943	943,546	19,196	4,461,798	5,511,483
February.....	70,969	849,597	16,010	3,581,742	4,518,318
March.....	65,532	892,105	15,978	4,078,951	5,052,566
April.....	69,544	823,368	8,341	2,782,318	3,683,571
May.....	59,957	652,410	6,239	2,416,741	3,135,347
June.....	47,745	451,088	4,563	2,026,296	2,529,662
July.....	36,537	354,884	3,058	1,912,885	(a)2,307,864
August.....	31,172	354,719	3,125	1,968,721	(a)2,328,237
September.....	33,877	441,508	5,392	2,248,020	(a)2,729,297
October.....	46,071	540,748	8,388	2,828,115	3,423,322
November.....	56,513	757,249	10,654	3,356,408	4,186,824
December.....	70,169	853,236	15,237	3,937,083	4,875,725
Total.....	675,029	7,914,408	116,201	35,569,078	44,276,216

(a) Includes production from Fort Norman, Northwest Territories.

Table 194.—Natural Gas Production in Ontario, by Fields, 1942 and 1943

County	Field	1942	1943
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	32,419	28,732
	(Tilbury, Romney and Raleigh)	2,528,029	2,445,565
Kent.....	Declute.....	824,325	475,567
	Dover.....	310,261	220,133
	Chatham.....	1,127,281	313,231
Lambton.....	Dawn.....	1,526,149	1,092,293
Middlesex.....	Oil Springs.....		9,779
Oxford.....	Moea.....		
	South Norwich.....		3,730
Elgin.....	Brownsville (x).....		
	Bayham.....	77,905	51,718
Elgin.....	Bayham.....	118,257	7,082
	Malahide.....	868,299	87,091
Norfolk.....	Norfolk.....	431,926	240,399
Lincoln.....	Lincoln.....		
Haldimand.....	Haldimand.....	2,124,122	2,470,967
Wentworth.....	Wentworth.....		
Welland.....	Welland.....	288,663	296,016
Brant.....	Onondaga.....	145,134	98,105
Prince Edward.....	Hallowell.....		
Wells in surface drift.....	Harwich and Howard Tps.....	14,000	14,000
Private wells.....		60,000	60,000
Total Produced.....		10,476,770	7,914,408

(x) Dereham Twp..... 58,782 M cu. ft.; Bayham Twp..... 19,123 M cu. ft.—1942

(x) Dereham Twp..... 36,710 M cu. ft.; Bayham Twp..... 15,008 M cu. ft.—1943

Table 195.—Number of Gas Wells in Canada, by Provinces, 1941-1943

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year.....	1941 42	3,240		3	95	3,350
	1942 40	3,277		3	104	3,424
	1943 42	3,344		3	108	3,497
Number of productive wells drilled.....	1941 3	173				176
	1942 2	148			4	154
	1943 5	149			10	164
Number of dry wells drilled.....	1941 143	144				143
	1942 144	144				144
	1943 105	144				105
Number of wells abandoned.....	1941 5	127				132
	1942 74	74				74
	1943 4	117			2	123
Productive wells at end of year.....	1941 40	3,277		3	104	3,424
	1942 42	3,344		3	108	3,497
	1943 43	3,346		3	116	3,598

Table 196.—Natural Gas Wells in Ontario by Townships, 1942 and 1943

Township	1942				1943			
	No. of producing wells in operation Dec. 31, 1942	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1943	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Ancaster				1				
Anderson				1				
Bayham	59	1		1	53	9		
Bertie	144	2			150		1	8
Binbrook	49			3	40			
Brant								7
Brantford	2			1	2			
Caistor	66	2		1	71	3	1	8
Camden Gore				6				1
Canboro	148	1			147	5		1
Cayuga N.	198	9		1	191	12	5	21
Cayuga S.	55	1		2	55		6	14
Charlotteville	13			2	13		3	2
Chatham	19	1		14	20		1	1
Colchester								
Crowland	27	1			26			
Culross				1				
Dawn	21				30	2	2	3
Delaware				1			1	
Delhi Village	3				3			
Dereham	8			3	18		1	
Dorchester N.				2				
Dover West					21	1		
Dover East	21							
Dunn	50	1			50	7	2	
Dunwich								
Enniskillen	1				3			
Gainsboro	15				15	3		
Glanford	10				10			
Gosfield S.	25				24			1
Hallowell								
Harwich				1				
Houghton	4			1	2			
Humberstone	77	3			82	5		
Kineardine								
Malahide	63	5	19		65	19	5	
Malden								
Mersea	3			1	3			
Middleton	48	1	1		48	5		
Mosa						1		
Moulton	102	9			97			8
Nassageya							1	
Norwich S.				2	1		1	
Nottawasaga							1	
Oneida	82	4	8	10	90	7	13	32
Onondaga	31	1			32	8		
Orford				2				
Oxford N.								
Oxford W.								
Port Dover Village	3				3			
Port Rowan	4				4			
Rainham	323	4	1	6	322	3	1	1
Raleigh	53			3	58		1	
Romney	133	2			141		1	1
Sarnia	13							
Seneca	161	4	2	1	157	2		
Sherbrooke	12	1	2	4	18		1	
Sombra							2	
Southwold				1				
Tilbury East	127	7	1		124		2	2
Townsend	4	1	3	8	11		14	10
Tuscarora	76	3	3	1	73	6	3	3
Wainfleet	26	1	6	6	32	1	5	2
Walpole	459	9	34	48	495	23	13	17
Walsingham N.	8						2	
Walsingham S.	15				23			
Westminster				1			3	
Wilboughby	53			1	53			
Windham	18			5	21		2	
Woodhouse	76			4	78		6	2
Yarmouth				2				
Zone							5	4
Private Wells	300				300			
Surface Wells	69				69			
Total	3,777	74	144	148	3,344	117	105	149

Table 197.—Capital Employed in the Natural Gas Industry in Canada, by Provinces, 1942 and 1943

	1942			1943		
	Ontario	Alberta	Canada*	Ontario	Alberta	Canada*
	\$	\$	\$	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—						
Cost of land, buildings, plant, machinery and tools.....	43,953,488	25,644,329	71,032,694	43,502,716	25,754,405	70,474,231
Cost of supplies and stock on hand.....	839,411	342,640	1,202,091	666,682	324,924	1,016,070
Cash, trading and operating accounts and bills receivable.....	7,447,188	2,926,010	10,533,817	9,096,292	3,165,150	12,472,862
Total.....	52,249,087	28,912,979	82,768,602	53,265,699	29,244,479	83,963,163

* Includes data for New Brunswick and Saskatchewan.

Table 198.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1942 and 1943

Province	*Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1942					\$	\$	\$
New Brunswick.....	11	11	71	93	40,610	104,901	145,511
Ontario.....	548	155	626	1,329	1,078,481	727,295	1,905,776
Saskatchewan.....	3	1	.....	4	4,500	.....	4,500
Alberta.....	243	60	211	514	573,068	297,956	871,024
Canada.....	805	227	908	1,940	1,696,659	1,130,152	2,826,811
1943							
New Brunswick.....	10	11	64	85	38,678	93,940	132,618
Ontario.....	520	142	533	1,195	1,077,628	656,540	1,734,168
Saskatchewan.....	5	1	.....	6	5,500	.....	5,500
Alberta.....	234	60	302	596	606,512	367,716	974,228
Canada.....	769	214	899	1,882	1,728,318	1,118,196	2,846,514

* See footnote on page 31, table 26.

Table 199.—Number of Wage-Earners in the Natural Gas Industry in Canada, by Months, 1943

Month	1943	
	Male	Female
January.....	678	14
February.....	678	10
March.....	675	15
April.....	687	15
May.....	784	14
June.....	862	16
July.....	945	19
August.....	932	18
September.....	898	20
October.....	824	21
November.....	776	19
December.....	708	16
Average.....	833	16

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum, and (2) Petroleum Products

(1) Production of Crude Petroleum

Production of crude petroleum and natural gasoline in Canada during 1943 totalled 10,052,302 barrels valued at \$16,470,417, compared with 10,364,796 barrels worth \$15,968,851 in 1942. Of this, 9,601,530 barrels came from Alberta wells, 132,492 barrels from Ontario, 293,750 barrels from the Northwest Territories, and 24,530 barrels from New Brunswick.

The following is an excerpt from a review on petroleum in 1943 as prepared by the Bureau of Mines, Ottawa:

"Of the total Canadian production of crude petroleum, 94 per cent came from the Turner Valley Field of Alberta, in which field the Rundle (Madison) Limestone of Palaeozoic age is the source of almost all of the output, an insignificant amount being obtained from sands in the overlying Cretaceous rocks. Production comes from both petroleum and gas wells and is supplemented by natural gasoline derived through the medium of absorption plants treating the gas from these wells.

"Until June 1936, except from a few wells along the margin of the gas-cap of Turner Valley field that yielded a heavier petroleum, production was derived almost entirely from gas wells in the form of so-called naphtha, an unstabilized natural gasoline. Since then all development has been diverted towards the western deeper-lying belt of the limestone where the same porous zones yield a liquid-phase petroleum. Here the gravity of the petroleum ranges from 38° API in the lower part adjacent to the edge-water to 45° API near the gas cap.

"Efforts to extend development north and south were continued in 1943 and the limit at either end does not appear to be reached, although nothing on the scale attempted at the north end in 1941 and 1942 was repeated. Interest centred largely in the area 9 miles long in the central part of Turner Valley, in which a limited amount of drilling had been done, the results of which were not encouraging. To stimulate the drilling of wells in order to keep up the supply of light petroleum for Western Canada from Turner Valley, which had been declining from its peak reached in February 1942, a company known as Wartime Oils was formed by the Dominion Government under the Oil Controller to finance such drilling. Money is loaned to the operator on the basis of a small royalty and low interest and is to be paid back out of production. Drilling was started in the summer and by the end of the year three wells had been completed and eleven rigs were working. Depending on results, at least twenty-six wells were planned.

"The deep hole that was started in 1942 on legal sub-division 2-25-19-3-5 as a co-operative effort by a number of operators to test whether the Devonian limestone underlay the west flank of Turner Valley passed from the Banff shales into Upper Blairmore (?) at 8,795 feet, thus demonstrating its absence in that locality. Production was subsequently obtained from the usual porous zones in the Rundle limestone at 7,662 feet.

"The repressuring experiment in the south end of Turner Valley, in which gas mainly from Frontier and Prairie wells has been returned to Foundation well, was continued throughout the year. No information as to results has been published.

"At the end of 1943 a total of 214 wells were in production in Turner Valley, 24 of which were completed during the year.

"Elsewhere in the Foothills of Alberta, some oil is reported to have been trucked to Calgary from Ram River No. 2 well, but no proper test had been made. The oil was reported to have a gravity of 41.5° API and to be low in sulphur. The test at Jumping Pound, close to the strike of the northward continuation of the north end of Turner reached the top of the Palaeozoic limestone at 11,588 feet and was completed at 12,056 feet. Although porosity in the limestone was good, water was struck and the well has since been abandoned. Farther south, drilling was proceeding at Sullivan Creek, west of Nanton, and at Maxmont a hole is reported to be over 9,700 feet.

"Drilling was active again on the southern plains of Alberta and was usually preceded by careful geological and geophysical surveys. Such work is facilitated by the regulations in force in the province, and at the end of the year it was reported that a total of nearly four million

acres were under permit for this purpose. No new sources of oil were discovered, but considerable success was achieved at Taber, where four wells are reported to have become major producers, the old problem of infiltration of water apparently having disappeared at the greater depths. Production from the Taber field was more than double that of 1942, and would have been greater had the market been available.

"Production from the Vermilion field increased from 2,500 barrels in May to 17,000 barrels in November. The refinery at Borradaile was closed during part of the year for the erection of new equipment.

"In the Pouce Coupe area, the hole spudded in during 1942 came in as a gas well at 2,173 feet.

"In Saskatchewan, the drilling of deep holes was continued. The hole at Radville penetrated the Silurian, and those at Ogema and Parry both reached the basement complex; at Dahinda drilling had entered the Jurassic. All of the holes, except the Radville, which was abandoned, had shows of petroleum that remain to be tested. Besides this deep drilling, much structural drilling and geophysical work was done. Another hole that penetrated sands carrying petroleum was drilled to 3,516 feet near Horsham.

"In Ontario, petroleum continues to be produced at Petrolia, Oil Springs, Bothwell, and in the townships of Dawn, Warwick, West Dover, and Mosa.

"In Quebec, Continental Petroleum, Limited began drilling on the Galt anticline on Gaspé Peninsula, where the limestone underlying the Devonian sandstone is exposed. At over 2,000 feet the hole was still in the limestone. Failing production at higher horizons it was intended to drill to the Silurian.

"In Prince Edward Island, Island Development Company, a subsidiary of Socony-Vacuum and Cities Service companies, following seismic surveys, began drilling in Hillsborough Bay. The well, which was being drilled on a pier, was intended to test Mississippi beds, hitherto not reached beneath the considerable thickness of the overlying Pennsylvanian.

"In New Brunswick, further geophysical work was done in the vicinity of the Stoney Creek field. One well was drilled and two were deepened. A slight decline occurred in production.

"In Nova Scotia, investigations were proceeding with a view to further test drilling.

"The important development started in 1942 in the Northwest Territories and known as the Canol Project was continued throughout 1943 with encouraging results. In 1942, sixteen wells were drilled at Norman Wells on the Mackenzie River, two of which failed to produce petroleum in commercial quantity, and in 1943 fourteen more were completed. In 23 of the total of 30 wells drilled oil in commercial quantities was found. Four of the others were 'wildcat' wells, and three were marginal. Including the original four wells, a total of 27 were productive at the end of the year and a fairly well defined area of over 5,000 acres was regarded as proven. Much of this lies beneath the Mackenzie River, although possibly over half of it can be reached by means of directional drilling. At this point the river, including islands, is three miles wide. Productive wells have been drilled on Bear Island and on the down-stream end of a sand bar called Goose Island.

"The productive formation at Norman Wells is a reef limestone that occurs at 1,050 to 1,150 feet in the shallow wells on the right bank of the river and at 1,706 feet in a well on Bear Island. The limestone is amenable to treatment with acid and the initial production of individual wells is up to expectations. Reservoir pressures generally are comparable to the hydrostatic head. The pipe line to connect the field with a refinery under construction at Whitehorse, Yukon Territory, was nearing completion early in June, 1944.

"The throughput of the refinery at Norman Wells was increased in September from 840 barrels to over 1,100 barrels a day. Products were aviation-base gasoline, white motor-gasoline, heavy naphtha, light Diesel fuel, reduced crude, and bottoms. A heavy Diesel fuel is blended from reduced crude, heavy naphtha, and crude petroleum.

Oil Shale

"There are large deposits of oil shale in different parts of Canada, the best known occurrences being in Pictou and Antigonish counties, Nova Scotia, and Albert and Westmorland counties, New Brunswick. As shale oil cannot compete with petroleum at present prices, none of these deposits has been actively developed on a commercial scale.

"Developments: In 1942, the Mines and Geology Branch, Department of Mines and Resources, Ottawa, drilled some of the oil shale occurrences in New Brunswick to determine their possibilities as a source of oil and lubricants under war conditions. A total of forty-three holes were drilled in oil shale deposits in the Rosevale area and in the vicinity of Taylor Village, New Brunswick; thirty-six holes were also drilled in deposits at Albert Mines, New Brunswick. The conclusion was reached that the over-all grade of the shales in the areas mentioned is too low to be of economic interest even under present conditions.

"Production and Trade: No production has been reported for a number of years and no oil shale is being imported into Canada.

"Experimental plants were erected in 1928-30 near Rosevale, New Brunswick, and New Glasgow, Nova Scotia, to treat local shales but they operated only for short periods. Activity has been confined chiefly to field exploration and to laboratory investigation. Laboratory work by the Bureau of Mines, Ottawa, has included the determination of the petroleum content of representative samples from various localities; the determination of important factors affecting the recovery of crude petroleum by destructive distillation and of the character of the petroleum recovered; and the investigation of the process designed for the distillation of oil shale.

"For many years the large-scale production of oil shale was confined to Scotland, but deposits in Manchuria and Esthonia were being developed in 1938 on a large scale. The production of these countries in 1938 was: Scotland, 1,551,346 tons; Esthonia, 1,450,885 tons; and Manchuria, approximately 3,000,000 tons. In 1939 South Africa is reported to have produced 3,000,000 gallons of shale oil. In Australia the Federal and New South Wales Governments are reported to be giving considerable assistance to the shale oil industry, the production in 1942 being 1,600,000 gallons of shale oil."

Table 200.—Production of Crude Petroleum in Canada, by Provinces, 1934-1943

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1934.....	11,106	22,277	141,385	299,874	1,253,965	3,104,823	4,438	22,188	1,410,895	3,449,162
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,445,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,797
1937.....	18,089	25,496	165,205	356,030	2,749,085	4,961,092	11,371	56,855	2,943,750	5,339,353
1938.....	19,276	27,246	172,641	359,268	6,751,312	8,775,094	22,855	68,565	6,966,084	9,230,173
1939.....	22,799	32,082	206,379	401,430	7,576,932	9,362,363	20,191	50,477	7,826,301	9,846,352
1940.....	22,167	31,220	187,644	397,078	8,362,203	10,694,394	18,633	37,265	8,590,978	11,160,213
1941.....	31,359	44,102	160,238	337,760	9,918,577	13,985,906	23,664	47,328	10,133,838	14,415,096
1942.....	28,089	39,467	143,845	306,242	10,117,073	15,514,665	75,789	108,477	10,361,796	15,968,851
1943.....	24,530	34,342	132,492	311,356	9,601,530	15,724,518	293,750	400,201	10,052,302	16,470,417

* Includes 331 barrels at \$256 in Saskatchewan.

Table 201.—Production of Crude Petroleum in Canada, by Months, 1943

(Barrel=35 imperial gallons)

Month	*New Brunswick	Ontario	*Alberta	*Northwest Territories	Canada
	Barrels	Barrels	Barrels	Barrels	Barrels
January.....	2,307	8,373	835,657	10,024	856,361
February.....	1,914	8,968	752,384	12,719	775,985
March.....	2,223	11,296	824,007	19,123	856,649
April.....	2,395	10,911	797,785	21,674	832,765
May.....	2,185	11,875	837,973	16,288	868,321
June.....	2,313	12,819	787,583	19,154	821,863
July.....	2,196	11,915	811,324	17,692	843,127
August.....	1,878	12,226	820,581	18,846	853,531
September.....	1,964	11,199	792,890	17,001	823,054
October.....	1,739	11,643	815,925	25,702	855,009
November.....	1,798	11,028	767,842	48,891	829,559
December.....	1,618	10,239	757,579	66,636	836,072
Total.....	24,530	132,492	9,601,530	293,750	10,052,302

* These figures include total output each month.

Table 202.—Petroleum Wells in Canada, by Provinces, 1941-1943

	New Brunswick	Ontario	Alberta	Northwest Territories	Canada
Productive wells at beginning of year.....1941	20	2,028	235	3	2,286
.....1942	20	1,956	274	3	2,253
.....1943	21	1,852	305	20	2,198
Number of productive wells drilled.....1941	35	48	.....	.....	83
.....1942	1	13	45	17	76
.....1943	1	1	66	9	77
Number of wells abandoned.....1941	31	9	.....	.....	40
.....1942	54	14	.....	.....	68
.....1943	144	6	3	.....	153
Number of dry wells drilled.....1941	39	10	.....	.....	49
.....1942	13	21	.....	.....	34
.....1943	17	19	1	.....	37
Number of productive wells in operation at end of year.....1941	20	1,956	274	3	2,253
.....1942	21	1,852	305	20	2,198
.....1943	22	1,728	365	26	2,141

Table 203.—Production of Crude Petroleum in Canada, 1942 and 1943

	1942		1943	
	Barrels	Total value	Barrels	Total value
NEW BRUNSWICK.....	28,089	\$ 39,467	24,530	\$ 34,342
ONTARIO—				
Petrolia and Enniskillen.....	51,917	109,315	45,308	105,300
Oil Springs.....	27,279	60,804	27,270	66,811
Moore Township.....	728	1,533	332	772
Sarnia Township.....	315	663	305	709
Plympton Township.....	24	50	26	60
Bothwell Township and Thamesville.....	27,946	58,842	25,908	60,212
West Dover, Romney, Raleigh, and Tilbury East.....	8,575	18,056	9,177	21,328
Onondaga.....	58	122	11	26
Mosa Township.....	19,209	40,446	16,327	37,945
Brooke.....	77	162	.....	.....
Dunwich.....	358	754	1,422	3,305
Dawn and Euphemia.....	597	1,257	439	1,020
Warwick, Metcalfe, and Adelaide.....	6,524	13,737	5,967	13,868
Chatham.....	.....	.....	.....	.....
Manitoulin Island.....	.....	.....	.....	.....
Collingwood.....	35	74	.....	.....
Private sales.....	293	427	.....	.....
Total for Ontario.....	143,845	306,242	132,492	311,356
SASKATCHEWAN.....	.....	.....	.....	.....
ALBERTA—				
Turner Valley.....	10,080,305	15,482,846	9,452,697	15,124,315
Red Coulee (light crude).....	9,546	9,400	8,928	9,107
Wainwright-Ribstone (heavy crude).....	27,222	22,419	139,905	591,096
Taber-Moose Dome.....	.....	.....	.....	.....
Total for Alberta.....	10,117,073	15,514,665	9,601,530	15,724,518
NORTHWEST TERRITORIES.....	75,789	108,477	293,750	400,201
Canada.....	10,364,796	15,968,851	10,057,302	16,470,417

Table 204.—Capital Employed in the Petroleum Industry in Canada, by Provinces, 1942 and 1943

	1942			1943		
	Ontario	Alberta	Canada*	Ontario	Alberta	Canada*
Capital employed as represented by:	\$	\$	\$	\$	\$	\$
Cost of land, buildings, plant, machinery and tools.....	1,057,720	41,932,130	43,583,146	894,381	41,922,779	47,344,151
Cost of supplies and stock on hand.....	15,987	2,539,811	2,878,305	8,921	2,548,797	2,857,718
Cash, trading and operating accounts and bills receivable.....	28,121	7,571,882	8,245,831	22,122	8,251,631	8,856,753
Total.....	1,101,828	52,043,823	54,707,282	925,424	52,723,207	59,058,622

Data for New Brunswick included with the Natural Gas Industry.
 * Includes data for the Northwest Territories.

Table 205.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces,* 1942 and 1943

Province	Average number of employees				Salaries and wages		
	Salaried employees		Wage- earners	Total	Salaries	Wages	Total
	Male	Female					
1942					\$	\$	\$
Ontario.....	18	3	189	210	21,071	118,840	139,911
Alberta.....	337	106	1,197	1,640	910,688	2,279,270	3,189,958
Canada†.....	371	113	1,488	1,972	997,609	2,651,356	3,648,965
1943							
Ontario.....	13	3	146	162	16,922	109,543	126,465
Alberta.....	330	107	1,346	1,783	1,008,021	2,804,152	3,812,173
Canada†.....	496	155	1,748	2,399	1,547,605	3,665,290	5,212,895

* Data for New Brunswick is included in the Natural Gas Industry.

† Data for Northwest Territories included with Canada.

(2) PETROLEUM PRODUCTS INDUSTRY

Statistics for the Petroleum Products Industry cover all establishments in Canada which were occupied chiefly in (a) the refining of crude oil to produce gasoline, fuel oil, etc., and (b) the blending or compounding of lubricating oils and greases.

Thirty-five refineries and 17 blending plants, or a total of 52 works, reported under this category in 1943 and the aggregate value of production was \$187,106,054, an increase of 14 per cent over the 1942 total of \$163,716,515.

Output figures for 1943 included \$185,830,862 for petroleum refineries and \$1,140,133 for concerns engaged in blending oils and greases, against corresponding totals in 1942 of \$162,628,828 and \$1,087,687 respectively.

Thirty-five petroleum refineries operating in Canada during 1943 were distributed by provinces as follows: 8 in Saskatchewan, 7 in Alberta, 6 in Ontario, 4 in Quebec, 4 in Manitoba, 3 in British Columbia and 1 in each of Nova Scotia, New Brunswick and Northwest Territories. Compared with 1942, there was a decrease of 1 refinery in Alberta and an increase of 1 in Ontario. The operating refineries had a capacity of 242,215 barrels of crude oil per day, of which Ontario had 76,250 barrels or 31 per cent; Quebec, 67,000 barrels or 28 per cent; Nova Scotia, 34,000 barrels or 14 per cent; British Columbia, 24,500 barrels or 10 per cent; Saskatchewan, 16,825 barrels or 7 per cent; Alberta 18,400 barrels or 8 per cent; Manitoba, 3,650 barrels or 1 per cent; the Northwest Territories, 840 barrels or 0.3 per cent, and New Brunswick, 250 barrels. Location, type and capacity for each of these refineries is recorded in the directory at the end of this report.

During the year, 1,746,982,235 gallons of imported crude oil and 337,070,674 gallons of crude oil and absorption gasoline from Canadian wells, or a total of 2,084,052,909 gallons was put through Canadian refineries, this amounting to about 66 per cent of the rated capacity. Of the total crude input, about 69 per cent was imported from the United States and nearly 15 per cent from other countries, while about 16 per cent came from Canadian wells. The total cost at the refineries of all crude oil and naphtha charged to stills during the year was \$127,907,890. Stocks of crude oil held at the refineries on December 31 amounted to 175,148,256 gallons.

Refinery production of gasoline in 1943 amounted to 869,288,237 gallons, and in addition the refineries used for blending about 21,647,290 gallons of imported casinghead gasoline which is not included in the Canadian production figures. The gallonage of gasoline made in 1943 was 16 per cent over 1942, which, in turn, was 12 per cent under 1941. The refinery selling

value of the gasoline made during the year was \$110,043,999. Stocks of gasoline held by the refineries on December 31 included 81,654,646 gallons of straight run or cracked gasoline and 1,036,670 gallons of imported casinghead gasoline. In 1943 there was an output of 16,319,590 gallons of natural gasoline from absorption plants in Alberta. This was practically all sold to refineries and is included with the gallonage charged to stills, and the refined gasoline made therefrom is included in the refinery output figures.

Imports of gasoline, including casinghead, amounted to 97,504,792 gallons during 1943, which, added to the production of 869,288,237 gallons less the increase in producers', distributors', and consumers' stocks of 27,819,974 gallons and less the exports of 21,494,799 gallons, made an apparent Canadian consumption of 917,478,256 gallons. Actual sales, as reported to the Bureau on a monthly basis, amounted to 903,592,163 gallons.

Production of fuel and gas oils (excluding any made and used for cracking processes) totalled 893,649,905 gallons, of which 809,950,476 gallons were made for sale and 83,699,429 gallons for use as fuel in the producing plant. Imports amounted to 53,570,321 gallons and exports to 54,687,171 gallons. Stocks of fuel oil and distillate at the end of the year stood at 275,469,561 gallons, or about 43,669,103 gallons more than in 1942. Output of tractor and engine distillate was 39,433,111 gallons in 1943, imports amounted to 596,503 gallons, and producers' stocks declined 2,217,713 gallons. The apparent consumption of fuel oils and distillate in Canada, as calculated from the above figures, amounted to 891,111,279 gallons.

Capital employed in the petroleum refining industry in 1943 was reported at \$89,643,702 of which \$43,145,830 was the value placed on land, buildings, machinery and equipment, \$41,329,983 represented inventories of finished products and processing materials, and \$5,167,889 were for operating capital, such as, cash, bills and accounts receivable. The monthly employment averaged 5,995 persons who received \$12,595,891 in salaries and wages. Expenditures for fuel and electricity amounted to \$8,234,286 and \$137,492,025 were paid out for crude oil and other processing materials.

For more complete information see the Dominion Bureau of Statistics report "The Petroleum Products Industry in Canada 1943".

Table 206.—Materials Used in Petroleum Refineries, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Crude oil (under 60° A.P.I.) in its natural state, from Canadian wells.....	Imp. gal.	349,255,157	19,047,524	322,873,457	17,371,041
Absorption gasoline, etc., from Canadian wells (run to stills).....	Imp. gal.	10,280,581	726,600	14,197,217	891,721
Crude oil, in its natural state, imported, (run to stills)—					
(a) From United States.....	Imp. gal.	1,146,769,895	69,828,576	1,443,428,128	91,367,996
(b) From Other Countries.....	Imp. gal.	396,913,456	21,572,639	303,062,252	18,203,645
Crude oil, not in its natural state (run to stills).....	Imp. gal.	7,933,800	1,278,635	491,855	73,487
Benzol for blending.....	Imp. gal.	3,954,267	531,217	2,674,901	382,248
Phenol.....	pound	631,331	93,547	557,559	82,103
Sulphuric acid, 66° Be.....	pound	34,741,455	396,297	40,683,213	462,617
Sulphur.....	pound	63,375	1,561	94,432	2,360
Caustic soda.....	pound	5,786,123	171,668	6,218,934	178,163
Soda ash.....	pound	327,366	7,350	398,557	9,377
Litharge.....	pound	195,309	17,245	305,045	23,582
Fullers' earth and clay.....	pound	24,162,091	523,350	25,390,653	601,283
Compounding materials.....			227,931		287,571
Tetraethyl fluid.....	c.c.	1,538,594,864	3,523,276	1,752,403,904	4,024,703
Blending stocks for aviation gasoline.....	Imp. gal.		1,758,052	7,925,244	2,061,939
Other materials.....			677,034		800,930
Shipping containers.....			789,534		667,259
Total.....			121,177,036		137,492,025
Lubricating oils and greases.....			747,220		667,959
Grand Total.....			121,924,256		138,159,984

Table 207.—Products Made in Petroleum Refineries, 1942 and 1943

Product	Unit of measure	1942		1943	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
MADE FOR SALE—					
Gasoline ⁽¹⁾ —Straight run ⁽¹⁾ —Aviation	Imp. gal.	90,510,113	18,074,919	118,866,138	23,250,266
Standard	Imp. gal.	288,678,830	31,961,334	273,228,417	31,567,666
By cracking ⁽²⁾ —Aviation	Imp. gal.	305,165	48,582	1,641,220	290,331
Standard	Imp. gal.	369,680,137	41,840,140	475,323,338	54,884,836
Stove oil (40°–42–5° A.P.I.)	Imp. gal.	24,515,578	1,652,595	27,628,033	1,689,781
Gas and light fuel oil (20°–40° A.P.I., except diesel)	Imp. gal.	141,126,499	8,616,052	131,731,939	7,986,051
Diesel fuel oil (all fuel oil sold under this name)	Imp. gal.	79,247,928	4,644,937	113,610,054	6,425,857
Residual fuel oil (10°–20° A.P.I.)	Imp. gal.	548,836,428	24,978,037	536,980,450	25,754,878
Tractor and engine distillate	Imp. gal.	44,636,725	4,534,787	39,433,111	3,926,571
V. M. and P. or solvent naphtha	Imp. gal.	20,907,259	2,355,333	24,842,055	2,870,943
Kerosene	Imp. gal.	24,912,066	2,766,291	29,014,580	3,091,665
Lubricating oil	Imp. gal.	38,076,120	7,405,169	39,651,627	8,671,595
Lubricating grease	pound	20,874,531	1,171,490	21,411,920	1,216,548
Asphalt	Imp. gal.	55,008,547	4,709,563	45,879,562	3,792,572
Petroleum coke	ton	64,461	464,326	78,166	567,482
Other products ⁽³⁾			1,232,878		2,606,815
Total—Made for Sale			156,465,433		178,593,857
MADE FOR OWN USE—					
Gasoline—Straight run	Imp. gal.	182,635	22,937	151,221	41,780
By cracking process	Imp. gal.	7,870	1,121	77,903	9,120
Stove oil	Imp. gal.	890	39	1,017	52
Gas and light fuel oil (20°–40° A.P.I.)	Imp. gal.	69,101	4,232	47,781	3,111
Diesel fuel oil	Imp. gal.	72,646	4,302	107,178	6,103
Residual fuel oil (10°–20° A.P.I.)	Imp. gal.	65,932,327	3,068,787	83,543,453	3,996,747
Tractor and engine distillate	Imp. gal.	39,354	3,254		
Kerosene	Imp. gal.	45,730	4,814	182,622	18,510
Lubricating oil	Imp. gal.	61,516	12,755	92,198	20,182
Lubricating grease	Imp. gal.	57,236	5,324	27,997	2,137
Asphalt	ton	8,950	63,411	7,146	49,355
Petroleum coke	M cu. ft.	7,621,105	2,734,711	8,385,106	2,953,760
Still gas			237,708		271,207
Other products					
Total—Made for Own Use			6,163,395		7,372,064
Fuel and gas oils and topped crude, for use in cracking process	Imp. gal.	522,046,536		640,764,520	
Lubricating oils and greases—					
Grease, lubricating	pound	1,728,281	217,755	1,103,187	172,642
Oils, lubricating	gallon	1,236,595	782,436	1,295,122	860,879
Soaps and soap powders	pound	500,294	43,209		34,368
All other products			44,287		72,244
Total			1,087,687		1,140,133
Grand Total			163,716,515		187,106,054

(1) Includes recoveries from Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casinghead gasoline which was used for blending at the refineries.

(2) Includes polymer gasoline.

(3) Includes wax, candles, still gas for sale, butane, propane, cumene, etc. These items were reported by fewer than three companies so, in accordance with the provisions of the Statistics Act, the figures cannot be shown separately.

CHAPTER EIGHT

THE NON-METALLIC MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Asbestos	Miscellaneous	Magnesitic dolomite
Feldspar, Nepheline	Barite	Magnesium sulphate
Syenite and Quartz	Diatomite	Mineral waters (natural)
Gypsum	Fluorspar	Phosphate
Iron oxides (ochre)	Garnet	Pyrites (sulphur)
Mica	Graphite	Silica brick
Peat fuel	Grindstones, etc.	Sodium carbonate
Peat moss	Lithium minerals	Sodium sulphate
Salt		Strontium minerals
Talc and soapstone		

THE ASBESTOS MINING INDUSTRY, AND THE ASBESTOS PRODUCTS INDUSTRY

Canadian production of asbestos in 1943 totalled 467,196 short tons valued at \$24,409,416 compared with 439,459 short tons worth \$22,663,283 in 1942. The value of the 1943 output was the greatest ever recorded in the history of the Canadian asbestos mining industry, and the tonnage was exceeded only by that of 1941 when the mines reported a production of 477,846 tons. The mineral in 1943 came, as usual, entirely from deposits located in the province of Quebec.

Nine firms were engaged in asbestos mining during 1943; capital employed amounted to \$20,831,000; employees numbered 3,844; and salaries and wages paid were reported at \$5,576,734. Fuel and electricity consumed was valued at \$1,625,450 and \$1,651,260 were expended for explosives, drill steel, and other process supplies. The value of new equipment purchased totalled \$300,738 and the industry paid, during the year under review, a total of \$4,511,704 in taxes.

Exports of Canadian asbestos in 1943 included 1,990 tons of crude valued at \$859,511; 210,837 tons milled fibres worth \$15,673,929; asbestos waste, refuse and shorts, 230,172 tons at \$5,848,031, and asbestos manufactures, \$139,209. Imports of various asbestos products were appraised at \$2,305,162.

The following information is from a report "Asbestos in 1943" as prepared by M. F. Goudge of the Bureau of Mines, Ottawa:

"Asbestos of commerce consists mostly of the three varieties known as chrysotile, amosite, and crocidolite or blue asbestos, with chrysotile being by far the most important and widely used. Three other varieties that have only a limited field of usefulness are fibrous actinolite, fibrous tremolite, and anthophyllite.

"The asbestos produced in Canada is practically all of the chrysotile variety and comes almost entirely from areas of serpentinized rock in the Eastern Townships, Quebec, where the producing centres are Thetford Mines, Black Lake, East Broughton, Vimy Ridge, Asbestos, and St. Remi de Tingwick. The Canadian deposits are the largest known in the world. Production has been continuous from the Thetford area since 1878 and reserves of asbestos-bearing rock are enormous. Core-drilling to depths greater than 1,700 feet has revealed the presence of fibre comparable in quantity and quality with that in the present workings. Most of the output consists of vein fibre obtained from veins $\frac{1}{4}$ to $\frac{1}{2}$ inch in width, though veins exceeding 5 inches in width do occur. The fibres run crosswise of the vein and thus the width of the vein determines the length of fibre. Slip fibre, occurring in fault planes, is obtained largely in the East Broughton area.

"In 1943 there were six producing companies. Asbestos Corporation Limited worked two properties at Thetford Mines and one each at Black Lake and Vimy Ridge. Johnson's Company operated at Thetford Mines and at Black Lake. Bell Asbestos Mines, Limited operated at Thetford Mines; Quebec Asbestos Corporation, Limited, at East Broughton; Canadian Johns-Manville Company, Limited, at Asbestos; and Nicolet Asbestos Mines, Limited, at St. Remi de Tingwick.

"The asbestos-bearing rock is mined in open pits and underground. Most of the underground work consists of block-caving, though other methods of underground mining are also used.

"Small deposits of chrysotile asbestos are known in other parts of Quebec and also in Ontario and British Columbia. Several have been worked from time to time. The asbestos from some of these small deposits has a very low content of iron and is entirely free from magnetite, and should be suitable for use in making insulation for electrical machinery.

"No amosite or crocidolite have yet been found in Canada, but there are numerous deposits of fibrous tremolite, fibrous actinolite, and anthophyllite, which varieties are commercially termed amphibole asbestos. The fibres of these varieties are harsher and weaker than those of chrysotile and there is little demand for them at present. None of these deposits is being worked, although formerly fibrous actinolite was quarried near the village of Actinolite, Hastings county, Ontario, for use in the making of roofing materials. Asbestos deposits reported as having been found in recent years in Manitoba and in northern and western Ontario are of the amphibole varieties. The amphibole fibres are too harsh and brittle to be spun, but they have a higher resistance to acids than has chrysotile and it is possible that material from some of the deposits may be suitable for use in acid filters and for other purposes where long harsh fibres are required.

"Few figures on recent world production are available, but it is known that Canada maintained its position as the principal asbestos-producing country. Other countries producing relatively large quantities of asbestos are Russia, Rhodesia, Union of South Africa, Swaziland, the United States, and Cyprus. Small shipments of asbestos are made from Australia (crocidolite), Bolivia (crocidolite), China (chrysotile), India (chrysotile), and Venezuela (chrysotile). The world's largest market for asbestos is in the United States, and Canada's proximity to this market confers very real advantages on the asbestos industry in this country. Another development favouring the Canadian industry is the increasing demand for short grades of fibre for use in newly developed asbestos-cement products, and in moulded plastic articles.

"Most of the Canadian production of asbestos is exported in the unmanufactured state, i.e. either in the crude condition (long-fibred material only), in a partly opened state, or completely fluffed out and ready for manufacture. The great bulk of exports goes to the United States, but substantial quantities are also exported to the United Kingdom and Australia. Since September 20, 1939, the Dominion Government has controlled the export of asbestos. Late in 1942 some minor modifications were made in the classification of standard grades of Canadian asbestos and this revised classification has been adopted by the Quebec Asbestos Producers' Association.

"Asbestos is used for a great variety of purposes, the principal asbestos products being: brake linings, clutch facings, packings, cloth, insulation, millboard, siding, shingles, roofing, tile, and pipes.

"Current prices f.o.b. Quebec mines, in U.S. funds, tax and bags included, are as follows: No. 1 crude, \$650 to \$750 per ton; No. 2 crude, \$165 to \$385; spinning fibre, \$124 to \$233; shingle fibre, \$62.50 to \$85; paper fibre, \$14 to \$49; cement stock, \$28.50 to \$33; floats, \$19.50 to \$21; shorts \$12 to \$16.50 per ton."

A report issued by the United States Department of the Interior contains the following information:

"Ordinarily the United States produces 4 to 6 per cent of its requirements of asbestos fibres, but in 1943 according to statistics compiled by the Bureau of Mines, United States Department of the Interior, it furnished only 1 per cent. Most of the domestic production consists normally of the shorter grades of chrysotile, but the principal producer of these grades suspended operations temporarily in 1943 while opening up a new quarry.

"Canada supplied the larger part of United States needs for chrysotile, but Canadian output is chiefly of the non-spinning shorter grades. African chrysotile was imported in substantial quantities to supplement the supply of Canadian spinning fibres. Soviet Russia, Australia, and India are other sources of supply.

"Asbestos is an important mineral in the military program. The United States is dependent almost entirely for its supply of the critical grades on imports from Canada, Southern Rhodesia and the Union of South Africa. The domestic contribution of critical grades is negligible."

Table 208.—Sales and Shipments* of Canadian Asbestos, 1941-1943

	1941		1942		1943	
	Tons	\$	Tons	\$	Tons	\$
Crudes.....	2,846	980,217	2,889	1,233,184	2,016	888,099
Fibres.....	223,767	14,812,871	199,829	15,339,128	217,889	16,071,843
Shorts.....	251,233	5,675,752	236,741	6,090,971	247,291	6,209,563
Total.....	477,846	21,468,840	439,459	22,663,283	467,196	23,169,505
Sand, gravel, and stone (waste rock only) (a)	8,454	6,805	8,090	7,925	6,914	6,745

	1941	1942	1943
		(tons)	
Quantity of rock mined.....	7,707,367	8,233,516	7,929,471
Quantity of rock milled.....	6,366,670	6,795,459	6,823,532
Value of containers.....	(b)	(b)	1,233,166

(*) All from the province of Quebec unless otherwise noted.

(a) This production is included under the sand and gravel industry.

(b) Data not available.

Table 209.—Sales and Shipments of Asbestos, 1926-1943

Year	Tons	\$	Year	Tons	\$
1926.....	279,403	10,099,423	1935.....	210,467	7,054,614
1927.....	274,778	10,621,013	1936.....	301,287	9,958,183
1928.....	273,033	11,238,860	1937.....	410,026	14,555,791
1929.....	306,055	13,172,581	1938.....	289,793	12,890,195
1930.....	242,114	8,390,163	1939.....	364,472	15,859,212
1931.....	164,296	4,812,886	1940.....	346,805	15,619,865
1932.....	122,977	3,039,721	1941.....	477,846	21,468,840
1933.....	158,367	5,211,177	1942.....	439,459	22,663,283
1934.....	155,980	4,936,326	1943.....	467,196	23,169,505

Table 210.—Consumption of Asbestos in Specified Canadian Industries, 1942 and 1943

Industry	1942		1943	
	Quantity	Cost at works	Quantity	Cost at works
Electrical Apparatus and Supplies—		\$		\$
Board..... pound	(x)	97,604	(a)	(a)
Yarn..... pound	(x)	13,597	(a)	(a)
Tape..... pound	(x)	16,690	(a)	(a)
Boilers, tanks and engines.....	(x)	38,043	(x)	28,983
Asbestos Products—				
Fibre..... ton	12,107	503,340	11,536	548,706
Other forms..... ton	565	264,531	.....	227,487
Roofing paper..... ton	755	17,493	823	18,275
Cotton goods, n.e.s..... pound	20,515	1,118	10,768	607

(x) Not available.

(a) Not reported in 1943.

Table 211.—Imports Into Canada and Exports of Asbestos, 1942 and 1943

	1942		1943	
	Tons	\$	Tons	\$
IMPORTS—				
Asbestos clutch facings for automobiles, motor vehicles and chassis		317,115		347,844
Asbestos brake linings for automobiles, motor vehicles and chassis		707,894		405,220
Asbestos brake linings and clutch facings, n.o.p.		96,829		37,439
Asbestos in any form other than crude, and all manufactures of, n.o.p.		1,330,179		1,368,216
Asbestos packing	139	158,373	140	146,443
Total		2,610,390		2,305,162
EXPORTS—				
Asbestos (crude)	2,796	1,190,989	1,990	359,511
Asbestos milled fibres	198,452	15,056,981	210,837	15,673,929
Asbestos waste, refuse and shorts	226,209	5,666,831	230,172	5,848,031
Asbestos manufactures, including asbestos roofing		173,361		139,209
Total		22,088,162		22,520,680

Table 212.—Principal Statistics of the Asbestos Industry in Canada, 1941-1943

	1941	1942	1943
Number of firms	9	8	9
Capital employed	21,325,558	18,741,364	20,831,427
Number of employees—On salaries (c)	314	329	345
On wages	3,446	3,420	3,499
Total	3,760	3,749	3,844
Salaries and wages—Salaries	679,394	731,836	772,455
Wages	4,316,707	4,567,618	4,804,279
Total	4,996,101	5,299,454	5,576,734
Selling value of products (a)	21,475,645	22,671,208	24,409,416
Cost of fuel and electricity (purchased)	1,524,450	1,646,291	1,625,450
Cost of process supplies (b)	2,721,796	2,747,682	1,651,260
Cost of containers	(d)	(d)	1,233,166
Net value of sales	17,229,399	18,277,235	19,899,540

(a) Includes value of sand and gravel.

(b) Explosives, drill steel, etc.

(c) In 1943 includes 91 females, 60 in 1942 and 45 in 1941.

(d) Not reported separately.

Table 213.—Capital Employed in the Asbestos Industry in Canada, 1943

	\$
Present cash value of the land (excluding materials)	2,620,473
Present value of buildings, fixtures, machinery, tools and other equipment	8,633,827
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand	2,071,491
Inventory value of finished products on hand	885,292
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	6,620,344
Total	20,831,427

Table 214.—Wage-Earners Employed, by months in the Asbestos Mining Industry in Canada, 1940-1943

Month	1940 Total	1941 Total	1942 Total	1943				
				Mine			Mill	
				Surface		Under-ground	Male	Female
				Male	Female	Male		
January.....	3,634	3,072	3,366	1,318	12	509	1,629	1
February.....	3,614	3,148	3,343	1,304	12	524	1,640	1
March.....	3,465	3,191	3,335	1,304	12	521	1,685	1
April.....	3,387	3,138	3,362	1,295	12	528	1,689	1
May.....	3,707	3,198	3,380	1,283	12	517	1,694	1
June.....	3,804	3,290	3,377	1,299	12	513	1,693	1
July.....	3,811	3,554	3,480	1,321	12	502	1,682	1
August.....	3,799	3,640	3,483	1,287	12	516	1,697	1
September.....	3,723	3,806	3,510	1,304	12	521	1,687	1
October.....	3,278	3,821	3,532	1,301	12	511	1,710	1
November.....	3,190	3,756	3,532	1,252	12	519	1,713	1
December.....	3,180	3,740	3,323	1,200	12	525	1,650	1

Table 215.—Taxes Paid by Asbestos Mining Industry in Calendar Year 1943

	\$
Dominion Income Tax, including tax on non-operating revenue.....	1,172,891
Dominion Excess Profits Tax.....	2,719,858
Provincial Taxes—	
Mining taxes paid on net profits from production, including portion paid to Municipality.....	452,710
Corporation Income Tax where levied in addition to Mining Tax.....	30
Taxes paid on capital and places of business.....	218
Acreage Taxes.....	
Total Provincial.....	452,958
Municipal Taxes—	
Based on property valuation.....	165,997
Based on non-operating revenue.....	
Total Municipal.....	165,997
Grand Total Taxes Paid.....	4,511,701

Table 216.—Certain Expenditures Made by the Asbestos Mining Industry, 1942 and 1943

	1942	1943
	\$	\$
Workmen's compensation.....	161,888	202,070
Unemployment insurance.....	61,833	63,629
Aggregate cost of all supplies purchased.....	3,503,085	3,420,456
Aggregate cost of plant and equipment purchased.....	440,542	303,738

THE ASBESTOS PRODUCTS INDUSTRY IN CANADA, 1943

Production by the manufacturers of asbestos goods in Canada in 1943 was valued at \$5,244,738 an increase of 2.8 per cent over the 1942 total of \$5,101,259. The Products included brake linings valued at \$1,785,667 boiler and pipe covering at \$801,017, clutch facings at \$179,781, asbestos packings at \$224,937, and such other lines as asbestos gaskets, cloth, yarn, dryer felts, cement, etc.

Thirteen factories were engaged in this industry, of which 6 were located in Quebec, 6 in Ontario and 1 in Nova Scotia. Fixed and working capital as represented by these works totalled \$5,798,080, the number of employees averaged 948 for each month of the year and payment in salaries and wages for the year amounted to \$1,396,708. Expenditures for fuel and electricity totalled \$180,871 and materials for manufacturing cost \$2,424,245.

Table 217.—Materials Used the Asbestos Products Industry, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos fibre.....	lb.	24,214,105	503,340	23,071,434	548,706
Asbestos cloth.....	lb.	62,638	21,037	67,938	32,727
Asbestos paper, corrugated and plain.....	lb.	522,999	25,548	562,516	28,542
Asbestos sheets and strips.....	lb.			29,994	18,926
Asbestos yarn.....	lb.	543,915	217,946	325,940	147,292
Cotton cloth and yarn.....			164,670		156,373
Rubber and rubber sheets.....	lb.	86,757	18,877	75,194	25,679
Containers and packing material.....			70,173		107,586
All other materials.....			1,370,901		1,358,414
Total.....			2,392,492		2,424,245

Table 218.—Products Manufactured in the Asbestos Products Industry, 1942 and 1943

Product	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos brake linings—Moulded.....	ft.	4,590,036	1,551,105	4,157,728	1,326,830
Other.....	ft.	1,492,199	403,904	1,826,829	458,828
Asbestos boiler and pipe covering.....	ft.	4,446,893	532,574	5,137,846	801,017
Asbestos clutch facings.....	No.	628,649	203,071		179,781
Asbestos gaskets.....	lb.	66,213	38,318		31,636
Asbestos packings of all kinds.....	lb.	559,828	241,929	487,798	224,937
All other Products (x).....			2,130,358		2,221,700
Total.....			5,101,259		5,244,738

(x) Includes products made by 1 or 2 firms, such as asbestos dryer felt, hydraulic brake hose, asbestos shingles, asbestos yarn, asbestos paper, asbestos cloth, etc.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this bulletin by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. Since 1936, corresponding statistics relating to the production of nepheline syenite have been included with those pertaining to the commercial production of feldspar and quartz.

During 1943 the gross value of production by the industry, and comprising the value of feldspar, quartz and nepheline syenite sold, totalled \$2,138,229 compared with corresponding values of \$1,998,996 in 1942 and \$1,838,054 in 1941. In 1943 commercial shipments of feldspar were made only from properties located in Ontario and Quebec; quartz (silica) in various forms was produced in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia, while production of nepheline syenite was confined to the province of Ontario.

The number of firms reported as active in the industry in 1943 totalled 35; capital employed was recorded at \$2,895,131; employees numbered 535; salaries and wages amounted to \$768,199 and the value of fuel, electricity and process supplies totalled \$456,852. The net value of all products sold in 1943 was estimated at \$1,681,377 compared with \$1,586,968 in 1942.

FELDSPAR

Production (producers' sales) of feldspar, crude and ground, during 1943 totalled 23,858 net tons valued at \$237,771 compared with 22,270 net tons worth \$213,941 in 1942. Of the 1943 output, 17,199 net tons were shipped from Quebec properties and 6,659 net tons from quarries in Ontario. The following information is from a recent report issued by the Bureau of Mines, Ottawa:

"Most of the feldspar mined in Canada is of high potash grade, though some operators also produce small amounts of soda spar. The latter type is rather uncommon as large deposits, but is sometimes found as zonal bodies in potash-feldspar pegmatites, usually along the walls. With the exception of 5,000 tons mined in the Pointe du Bois area, Manitoba, during the years 1934 to 1936, almost the entire production has come from adjacent sections of western Quebec and eastern Ontario, in the general Ottawa region. There has been a small production, also, from scattered properties in Ontario as far west as Parry Sound and Sudbury Districts. In recent years most of the production has come from about half a dozen mines, and until 1942 it was about equally divided between Ontario and Quebec. However, in that year and in 1943 output from Ontario declined to only 25 per cent of the total.

"In Ontario, the large quarry of Bathurst Feldspar Mines, in Bathurst township, Lanark county, which had been the leading producer in the province, was closed down in 1942, having reached the limit in depth of open-cast mining. Operations were continued through 1943, however, from surface on the southerly extension of the dyke, and production on a reduced scale was maintained. Frontenac Floor and Wall Tile Company, Kingston, operated its new Charles mine, also in Bathurst township, until September, when work was suspended. Most of the remaining output from Ontario in 1943 came from the Madawaska area, Nipissing District, where Madawaska Feldspar Company, in Murchison township, was the chief producer. Other operators in the same township were Keystone Contractors, Ltd., working the old Cameron mine, and Royal Feldspar Company, conducting development operations on the Hamilton property. Keystone Contractors, Ltd. also made shipments of low-grade spar (graphic granite) from a deposit in Gratton township, south of Eganville, Renfrew county, and for a short time Canadian Flint and Spar Company operated the old Cameron property in Dickens township, Nipissing district, near Barry's Bay. Some feldspar was also recovered at the property of Purdy Mica Mines, near Eau Claire, Mattawa district.

"In Quebec, the chief source of supply continued to be the large mine of Canadian Flint and Spar Company in Derry township, Papineau county, in the Lievre River section. This company also operated its New York mine, in Buckingham township, and a property near St. Pierre de Wakefield, in Wakefield township. United Mining Industries Limited, of Montreal, made shipments from a deposit in Buckingham township, west of the Lievre River, part of which was dental spar, and later moved to the Old Lapointe mine in West Portland township.

"A considerable part of the Canadian output is exported, mainly to grinding plants of Consolidated Feldspar Corporation, and Genesee Feldspar Company, at Rochester, New York. Exports of crude spar rose 15 per cent in 1943, from 11,016 tons valued at \$85,360 in 1942 to 12,724 tons valued at \$96,453. Imports of ground spar totalled 526 tons valued at \$12,886, compared with 563 tons valued at \$12,021 in 1942.

"Feldspar for domestic use is ground in mills operated by the following:

- Canadian Flint and Spar Company, Buckingham, Quebec
- Frontenac Floor and Wall Tile Company, Kingston, Ontario
- Bon Ami Company, Montreal East, Quebec.

"The first two companies grind material for ceramic uses, while the Bon Ami product is used in scouring compounds. Total domestic consumption of feldspar in 1942 was reported to be 12,253 tons. Of this, 4,344 tons was sold for the manufacture of scouring soaps and cleaners; 3,234 tons was used by the clay products industry; 2,880 tons by the glass trade; 1,676 tons for sheet-metal enamelling; and 119 tons in abrasive wheels, etc.- Production of milled spar in the same year was 12,428 tons.

"All of the feldspar used in industry is crushed or finely ground material, usually prepared either in mills operated by producers of the crude mineral or in merchant mills supplied from independent mines. Some manufacturers of ceramic products mine and grind spar for their own use. By far the greater part of the production is used in the ceramic industries.

"Most of the feldspar sold is of high-potash type, but a certain amount of high-soda spar also is in demand and is employed mainly for blending purposes for ceramic use. Feldspar has a relatively low fusion point and serves as the fluxing ingredient in all types of ceramic bodies.

It is an essential raw material for the manufacture of white wares, in glazes, and in porcelain enamels. In glass, it serves as an economical source of alumina and alkalis. All ceramic grades of feldspar are required to have a low content of iron oxide, the tolerance for which in pottery spar is 0.15 per cent and in glass spar 0.05 per cent. For this reason, the crude shipping product should be kept free of material carrying rust stain or such iron-bearing minerals as tourmaline, mica, pyrite, etc. Most commercial feldspars contain some quartz, which acts as a diluent, decreasing the fluxing power, and the content should be kept to a minimum. The fusion point of high-soda spars is lower than that of the high-potash types, the extremes for the two varieties ranging from cone 4 (1165°C) to cone 10 (1260°C), with the general average of commercial material around cones 8 to 9 (1225° to 1250°C). Practically all colours of feldspar are equally acceptable for ceramic uses, but for cleanser purposes, pale shades of white to buff are demanded.

"Commercial No. 1 feldspar for the ceramic trade consists of crude lump cobbled free of quartz and other objectionable impurities. Inferior grades, including graphie granite, which may contain 25 to 30 per cent quartz, are used for less exacting ceramic requirements. Quarry and cobbing fines are not acceptable, and go either to waste or may be sold for stucco dash, chicken grit, etc.

"Canada has large reserves of feldspar and production could be increased to meet any likely demand. Recent reports indicate that the supply of crude potash spar from mines in the Eastern United States is proving inadequate to meet requirements, and this may result in an increase in Canada's exports to that country. One outcome of the growing shortage is that renewed attention is being directed to the possibility that feldspar grinders may ultimately be compelled to resort to milling and concentrating of sub-grade rock to fill their needs. One plant for the production of glass-grade spar by flotation methods from straight-quarry-run rock was installed during the year in North Carolina.

"Canadian feldspar prices in 1943 increased slightly over those of previous years, quotations for crude ranging from \$6.50 to \$8.50 per ton, f.o.b. rail for domestic mills and export. Ground spar, 200-mesh, sold at \$16 to \$18, and granular glass spar at \$12, both f.o.b. mill, in carload lots. Special selected crude dental spar, for export, sold as high as \$48.50 U.S. funds."

Table 219.—Production of Feldspar, Crude and Ground, in Canada, by Provinces, 1930-1943

Year	Quebec		Ontario		Manitoba	
	Tons	\$	Tons	\$	Tons	\$
1930.....	17,074	163,802	9,722	104,667		
1931.....	10,381	86,842	7,962	100,119		
1932.....	3,390	39,063	3,657	42,920		
1933.....	6,183	59,283	4,387	45,350	88	484
1934.....	9,207	78,853	7,302	61,665	1,793	6,763
1935.....	7,002	63,075	8,656	75,003	2,084	6,232
1936.....	8,115	75,703	8,409	70,840	1,322	7,932
1937.....	12,285	105,612	9,061	72,610		
1938.....	5,874	62,878	8,106	65,964	78	451
1939.....	5,399	60,923	7,061	51,056	40	330
1940.....	8,548	89,004	12,907	98,619		
1941.....	14,218	137,160	11,822	107,124		
1942.....	16,802	164,588	5,468	49,353		
1943.....	17,199	176,222	6,659	61,549		

Table 220.—Feldspar Consumed in Specified Canadian Industries, 1942 and 1943

Industries	1942		1943	
	Tons	\$	Tons	\$
Abrasive products.....	119	4,113	117	5,776
Imported clay products.....	2,799	62,525	2,352	50,794
Soaps and cleaning preparations.....	4,249	43,904	12,733	63,283
Iron and steel products.....			509	10,824
Glass.....	2,874	45,231	2,598	41,454
Enamelling materials.....	331	4,965	265	3,840

(x) Quantity statistics not available.

NEPHELINE SYENITE

Producers' sales of nepheline syenite in 1943 were valued at \$292,010 compared with \$246,893 in 1942. Shipments during the year under review were made solely by the American Nepheline Corporation Limited. The deposit of this company is located in Methuen township, Peterborough county, Ontario. A report "Nepheline Syenite in 1943" as prepared by the Bureau of Mines, Ottawa, contains the following information:

"Nepheline syenite is a quartz-free crystalline rock consisting essentially of the feldspathoid mineral nephelite, a silicate of alumina, potash, and soda, with albite and microcline feldspars. It often contains varying amounts of iron-bearing minerals in the form chiefly of black mica and magnetite, together with such accessory minerals as zircon, corundum, calcite, scapolite, etc. It has no free silica, and is high in alumina (20 to 30 per cent in average commercial rock) as compared with straight feldspar (17 to 20 per cent), and it has thus found favour with the ceramic industries, particularly in the glass trade. For ceramic use the rock must be freed of its iron-bearing constituents, removal of which can often be readily effected by a relatively cheap process of magnetic separation at about 20-mesh size.

"The known occurrences of commercial nepheline syenite in Canada are situated mainly in Ontario, the developed deposits being in Peterborough, Hastings, and Haliburton counties. The large operation of American Nepheline Corporation (a subsidiary of Ventures Limited) at Blue Mountain, near Lakefield, in Peterborough county, has accounted for most of the output and was the only producer in 1943. Prior to that year small tonnages were produced intermittently from deposits near Bancroft, in Hastings county, and near Gooderham, in Haliburton county, the material being shipped in the crude state to grinding mills in the United States. The rock of the Blue Mountain occurrence is massive and medium-textured, whereas most of the production from the Bancroft and Gooderham areas has consisted of coarse pegmatitic material. Other known, but undeveloped occurrences in Ontario are in the French River area, Georgian Bay district, and at Port Coldwell, Thunder Bay district, on the north shore of Lake Superior. In Quebec, nephelite is a constituent of syenites of the Montreal, Labelle-Annonciation, and other areas. In British Columbia, there are extensive bodies in the Ice River district, near Field.

"Part of the output of American Nepheline Corporation's quarry is treated at the company's mill at Lakefield, which supplies the domestic trade, but most of it is shipped crude to the company's plant at Rochester, New York.

"In 1943, American Nepheline Corporation quarried 56,000 tons of crude rock and produced 28,000 tons of finished material in its Rochester mill and 6,200 tons in its Lakefield plant. In recent years, some of the milled granular product from the Lakefield mill has been custom-ground for ceramic use at the plant of Frontenac Floor and Wall Tile Company, Kingston, Ontario, but this arrangement was discontinued in 1943 and 200-mesh material for domestic use is now supplied from Rochester. Port Coldwell Mines and Metals, Ltd., which in 1943 took over nepheline syenite holdings of Port Coldwell Mining Syndicate on Lake Superior, acquired further ground in the Bancroft area and announced plans for developing a deposit there, including the erection of a 100-ton mill.

"Canadian production figures include the value of crude rock shipped to the United States for cleaning and grinding, and also that of finished products made in Canada for domestic consumption and export. Exports totalled 36,240 tons valued at \$129,826, compared with 32,840 tons valued at \$89,520 in 1942.

"Except for Russia, the output of which is unknown, Canada is the only producer of nepheline syenite. Russia recovers large tonnages of apatite (phosphate) from apatite-nephelite rock, extensive bodies of which occur in the Kola Peninsula, and much research has been carried out in that country on commercial uses for the by-product nephelite, including its substitution for bauxite as a raw material for the production of aluminium. Deposits of commercial grade are also reported to occur in British India. In the United States, a number of occurrences are known, but most of the material contains too much inseparable iron to be suitable for high-grade ceramic products.

"Nepheline syenite continues to be used chiefly in the glass trade, where it is preferred to straight feldspar because of its higher content of alumina. Most Canadian glass companies and also several large American plants now use the material. Some feldspar grinding plants in the United States use the syenite for blending with their granular glass spar. In the glass batch, 3 tons of syenite will replace 4 tons of feldspar, on the basis of relative alumina content, and the higher content of alkalis reduces the temperature of melting, with resultant saving of fuel and longer tank life. Research has been proceeding steadily on applications for nepheline syenite in other branches of ceramics and it has been found of advantage, owing to its higher fluxing action, as a body ingredient in a variety of products, including pottery, semivitreous ware, sanitary and electrical porcelain, floor and wall tile, and structural clay products, and also in enamels. Increased vitrification, translucency, and mechanical strength, improved glaze fit, and reduced absorption, warpage, thermal expansion, and crazing, are among the desirable properties claimed for the various types of ware made from it.

"Work has been proceeding in the Bureau of Mines, Ottawa, on the removal of the small content of corundum present in some sections of the Blue Mountain deposit, and it was found that a combination of jigging and flotation at 28-mesh was effective in reducing the corundum content to 0.134 per cent. A treatment unit, employing this method, which would provide also for the recovery of a corundum by-product, was placed in semi-commercial operation at the Rochester mill of American Nepheline Corporation during 1943.

"The fine dust product resulting from the processing of Lakefield syenite has been found of service as a substitute for pumice for grinding and polishing and in the cleanser, enamelware, and heavy clay industries.

"Glass-grade nepheline syenite for sale in Canada remained at the 1942 price of \$11.75 per ton, bulk, in carload lots, f.o.b. Lakefield, and ground, 200-mesh, ceramic grade was quoted at \$16.50. Grade B (dust) sold for \$13.00 l.c.l. American prices also remained unchanged at \$12.00 for glass grade and \$15.50 for ceramic grade, all bulk, in carload lots, f.o.b. Rochester, New York."

Table 221.—Production of Nepheline-Syenite in Canada*, 1936-1943

Year	Quantity	Value	Year	Quantity	Value
		\$			\$
1936.....	(a)	(b) 37,426	1940.....	(a)	117,849
1937.....	(a)	121,481	1941.....	(a)	227,583
1938.....	(a)	142,737	1942.....	(a)	246,893
1939.....	(a)	140,148	1943.....	(a)	292,010

(*) Produced in Ontario only.

(a) Quantity not published.

(b) First commercial production in Canada.

Nepheline-syenite used in Canada in the manufacture of glass totalled 3,472 tons valued at \$58,629 in 1939, 4,233 tons at \$69,619 in 1940, 5,834 tons worth \$94,091 in 1941, 6,144 tons worth \$100,417 in 1942 and 5,630 tons worth \$93,528 in 1943.

QUARTZ (SILICA)

The production of natural silica or quartz in Canada during 1943 totalled 1,776,749 short tons valued at \$1,608,448 compared with 1,738,174 tons at \$1,538,162 in 1942. Output of primary silica products by the Canadian quartz mining industry includes crude and crushed dyke quartz, quartzite, sandstone and natural silica sands and gravels. The mineral in one or more of the forms thus defined was produced during 1943 in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia. Shipments of silica in Nova Scotia were made to steel plants largely for the making of silica brick. In Quebec, high-grade silica sands were produced for the manufacture of glass and chemicals while a considerable tonnage of these same sands was sold for sand-blasting, moulding and various other purposes; in the same province relatively large quantities of crushed quartzite were mined and milled for the manufacture of silicon carbide

and other products. The greater part of the tonnage of silica shipped in Ontario during 1943 represented material intended for use in the production of silica brick, cement and ferro-silicon and for the fluxing of nickel-copper ores. Quartz production as recorded for Saskatchewan represented low-grade natural silica sands or gravels shipped as flux to the Flin Flon smelter of the Hudson Bay Mining and Smelting Co. Ltd. Production in British Columbia in 1943 consisted of quartz shipped to the Trail smelter from the Gypo and Bailey deposits located, respectively, in the Osoyoos and Greenwood Mining districts.

The price per ton of the several grades of silica varies greatly depending on its purity and on the purpose for which it is to be used. Silica generally is a low-priced commodity, and therefore the situation of a deposit with respect to markets is of great importance. The largest markets for silica are in the provinces of Quebec and Ontario, and new deposits to be of interest to these markets should be within economic reach of either Toronto or Montreal. In Western Canada the main markets are in Alberta and Manitoba.

Quotations as given by "Canadian Chemistry and Process Industries" are, silica sand, various grades, in car lots \$9.00 to \$9.50 a ton; silica, quartz, 99 per cent, 110-220 grade, in car lots, \$14.00 to \$20.00 per ton; silica, soft decomposed, 325 mesh, car, lots \$30.00 to \$35.00 per ton.

Table 222.—Production in Canada of Quartz, 1942 and 1943

	1942		1943	
	Short tons	Value	Short tons	Value
		\$		\$
PRODUCTION (x) (SHIPMENTS)—				
Nova Scotia.....	10,708	23,557	9,486	16,126
Quebec.....	203,219	543,817	214,959	605,916
Ontario.....	1,367,733	914,256	1,350,640	852,196
Saskatchewan.....	155,699	54,495	163,102	57,086
British Columbia.....	815	2,037	38,562	77,124
Canada.....	1,738,174	1,538,162	1,776,749	1,608,448

(x) Includes both crude and crushed quartz, crushed sandstone and quartzite, and natural silica sands.

Table 223.—Production* (Use) of Natural Low-Grade Silica Sand and Silica Gravel as Non-Ferrous Smelter Flux, 1941-1943

	1941		1942		1943	
	Tons	\$	Tons	\$	Tons	\$
Ontario.....	1,533,392	536,687	644,529	225,585	666,452 (†)	233,258
Saskatchewan.....	148,208	51,873	155,699	54,495	163,102	57,086
Canada.....	1,681,600	588,560	800,228	280,080	829,554	290,344

(*) Included in totals shown in Tables 4 and 6.

(†) Exclusive of low cost quartzite used in smelting nickel-copper ores.

Table 224.—Production of Quartz (Silica) in Canada, 1929-1943

Year	Ton	\$	Year	Ton	\$
1929.....	265,949	561,527	1937 (x).....	1,377,448	1,129,011
1930.....	226,200	418,127	1938 (x).....	1,380,011	961,617
1931.....	195,724	303,158	1939 (x).....	1,582,935	1,100,214
1932.....	189,132	276,147	1940 (x).....	1,858,302	1,203,527
1933.....	185,783	297,820	1941 (x).....	2,052,878	1,366,187
1934.....	272,563	482,265	1942 (x).....	1,738,174	1,538,162
1935.....	233,002	424,882	1943 (x).....	1,776,749	1,608,448
1936 (x).....	1,046,649	597,781			

(x) Complete data for production of this material in Ontario previous to 1936 are not available.

Prices—UNITED STATES (August, 1944)—Silica, per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air floated, 325 mesh, 92 to 99½ per cent silica, \$18 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton. Quartz rock crystals for fusing, all sizes, \$100 to \$150 per ton; prisms for piezo-electrical and optical use command premium. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

Table 225.—Consumption of Quartz, Silica Sand, Etc., in Canada, by Industries, According to Census of Industry Reports, 1943*

Industry	Quantity	Cost at works
	Short tons	\$
Silica sand and silica (including ground quartz)—		
Soaps and cleaning preparations.....	3,640	128,981
Acids and salts.....	39,406	145,366
Paints.....	1,388	45,075
Refractories.....	1,021	10,240
Roofing paper.....	2,135	21,015
Abrasives (silica sand).....	89,022	511,649
Abrasives (quartz).....	175	5,410
Glass.....	132,992	870,454
Enamelling materials.....	253	3,795
Products from imported clays.....	3,597	58,412
Foundry facings and supplies.....	62	609
Non-ferrous smelters (†).....	1,349,610	613,894
Steel industry (silica sand).....	116,374	868,316
Ferro-alloys (quartzite).....	188,636	526,676
Total Accounted for.....	1,928,311	3,809,692

NOTE:—Consumption values are costs at works.

(†) The quantities reported under this industry usually contain low-grade natural silicious sands for fluxing purposes.

(*) In addition to the quantities shown, a relatively large quantity of quartz and quartzite is consumed in the manufacture of silica brick.

Table 226.—Principal Statistics of the Feldspar and Quartz Mining Industry, 1942 and 1943

	Ontario (x) (b)		Quebec	
	1942	1943	1942	1943
Number of firms (a).....	17	19	19	16
Capital employed..... \$	1,452,823	1,632,379	1,110,425	1,262,752
Number of employees—On salary.....	24	41	22	27
On wages.....	234	227	253	240
Total.....	258	268	275	267
Salaries and wages—Salaries..... \$	39,186	69,702	52,081	49,001
Wages..... \$	333,791	324,248	357,845	325,248
Total..... \$	372,977	393,950	409,926	374,249
Selling value of products (gross)..... \$	1,290,591	1,356,091	708,405	782,138
Cost of fuel and purchased electricity..... \$	53,261	61,648	70,839	72,599
Cost of process supplies..... \$	204,167	234,759	83,761	87,846
Net value of sales..... \$	1,033,163	1,059,684	553,805	621,693

(x) In 1942 and 1943 includes 1 firm in Nova Scotia, 1 in British Columbia and 1 in Saskatchewan; data only for Nova Scotia are complete.

(a) Small shippers from whom reports were unobtainable and whose production is recorded from consumers' returns are sometimes not included in the total.

(b) Includes data relating to production of nepheline-syenite.

Table 227.—Capital Employed in the Feldspar and Quartz Mining Industry in Canada, by Provinces, 1943

	Quebec	Ontario	Canada
	\$	\$	\$
Capital employed as represented by—			
Present cash value of the land, (excluding minerals).....	55,817	104,186	159,991
Present value of buildings, fixtures, machinery, tools and other equipment.....	977,595	1,199,468	2,177,063
Inventory value of minerals on hand, ore in process, fuel and miscellaneous supplies on hand.....	94,008	235,847	380,855
Inventory value of finished products on hand.....	26,944	9,801	36,745
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)....	108,393	32,081	140,474
Total.....	1,262,752	1,632,379	2,895,131

Table 228.—Number of Wage-Earners on Pay Roll, by Months, 1942 and 1943

Month	1942 Totals	1943								Canada (x)
		Quebec			Ontario					
		Surface	Under- ground	Mill	Surface		Under- ground	Mill		
		Male			Male	Male		Female	Male		Female
January.....	458	163	3	67	152			20	2	422
February.....	446	172	2	73	161			22	2	450
March.....	449	153	1	79	175			22	2	438
April.....	447	117	1	71	184	1	11	25	2	418
May.....	546	148	1	68	169	1	33	35	2	474
June.....	544	164		76	174	1	29	39	1	503
July.....	531	167		77	153	1	21	37	1	485
August.....	526	172		78	163	1	28	43	1	506
September.....	522	174		81	179	1	31	33	1	529
October.....	507	176		75	157	1	24	33	1	488
November.....	473	176		76	150	1	21	49	1	479
December.....	362	179		76	120			26	1	416

(x) Includes a few employees in some months in Nova Scotia and British Columbia.

QUARTZ CRYSTAL

Modern mechanized warfare depends upon instantaneous two-way radio communication, which to be effective, must rely upon accurately ground wafers of crystal, two in each circuit; dozens are needed for a single tank or airplane. Brazil remained at the close of 1943 the only known commercial source of quartz suitable for radio-frequency control, and radio quartz crystal has been classified as a strategic mineral. No commercial production of domestic quartz crystals was reported in Canada during 1943; however, The Rare Metals Prospecting Syndicate reported development work during the year on a quartz crystal deposit located north of Gananoque, in the province of Ontario. Imported crystals have been dressed in Canada for war use since the beginning of the present world conflict. The following information is taken from Engineering & Mining Journal Metal and Mineral Markets, New York, February, 1944:

"Wartime consumption of quartz crystals suitable for radio frequency control has increased fiftyfold, compared with prewar levels, necessitating a large increase in output in Brazil. . . . The value of exports of quartz crystals from Brazil at present is at approximately the same level as that of phosphate rock produced in the United States, and exceeds the combined value of United States production of crude feldspar, fluorspar and crude gypsum. During 1943 a serious attempt was made to discover and exploit United States deposits but the material recovered has proved too low grade for continued operations. Heavy consumption of radio-grade quartz crystals, including stockpiling under the established program, could not have been met, solely through increased production. A major contribution here was the energetic conservation and substitution program pushed by the Government late in 1942 and early in 1943, which resulted in discovering the usability of inferior quartz for manufacture of satisfactory radio oscillators. Scrap recovery also contributed to this program. Another outstanding part of the conservation program was the drive to increase cutting efficiency, and at the same time redesign oscillators to smaller sizes, thereby securing many more oscillators per pound of usable material."

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

Production (producers' sales and producers' consumption) of gypsum in Canada during 1943 totalled 446,848 short tons valued at \$1,381,468 compared with 566,166 short tons worth \$1,254,182 in 1942. The tonnage in both years represents various grades of crude gypsum or anhydrite shipped from quarries or mines together with the tonnage of calcined gypsum used in or shipped from quarries or "primary" plants. The quantity of crude gypsum shipped in 1943 was the lowest since 1933, reflecting largely the increasing man-power shortage, wartime restrictions in building materials, and the decrease in coastal shipping available at Nova Scotia ports.

Of the 1943 output, Nova Scotia properties contributed 255,736 tons valued at \$368,639; New Brunswick 36,263 tons at \$148,315; Ontario 92,448 tons at \$335,637; Manitoba 37,989 tons at \$380,529, and British Columbia 24,412 tons worth \$148,348.

The quantity of crude gypsum mined in 1943 totalled 430,822 short tons; no anhydrite was reported as being produced during the year. Crude gypsum calcined in primary or quarry plants totalled 201,168 short tons in 1943.

In 1943 the number of firms reporting production was 6. Some of the Canadian gypsum mining companies confine their operations in the Dominion to the production and sale of crude gypsum or anhydrite while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants. Gypsum is exported from Canada almost entirely in the crude form.

Capital employed by Canadian gypsum mining companies totalled \$5,147,424 in 1943; employees numbered 438; salaries and wages paid amounted to \$617,780, and the total value of fuel, purchased electricity and process supplies used was computed at \$248,043.

The following information is from a report—Gypsum in 1943—as prepared by the Bureau of Mines, Ottawa.

"Gypsum is marketed in the crude lump form; ground, as "land plaster" and "Terra alba"; or ground and calcined, as plaster of Paris or wall plaster. Each year an increasing portion of the calcined material is used in the manufacture of wallboard, gypsum blocks, insulating material, acoustic plaster, etc.

"The use of gypsum products in the building trades has made rapid progress because of their lightness, durability, fire-resisting, insulating, and acoustic properties; and tiles, wallboards, blocks, and special insulating and acoustic plasters have been developed. It is probable that the production of gypsum for domestic use will continue to decline during 1944. As most of the crude gypsum is shipped to the United States for the manufacture of gypsum products, industrial conditions in that country will continue to have an important bearing on the industry.

"The use of anhydrite for the manufacture of sulphuric acid, ammonium sulphate, cement and special plasters is increasing, and, normally, there is a good opportunity for the Canadian material in this market. Canada has extensive deposits favourably situated for commercial development, the material from which has been proved by tests carried out by the Department of Mines and Resources to be of excellent grade. Prior to 1937 the small Canadian production was exported principally for use as a fertilizer for the peanut crop, but it is possible that an industry will eventually be started in this country in which the anhydrite may be used for the manufacture of sulphur or sulphur compounds and of special plasters, similar to those being marketed in England.

"The manufacture of gypsum boards, for which there has been a large demand in recent years, has partly compensated for the decrease in use for residential building purposes.

"Crude gypsum is a low-priced commodity, and its selling price f.o.b. quarry is dependent largely upon the quantity produced and the production facilities available. For export, contracts are generally made with the producer for the year's requirements of the purchaser and these contracts are generally made early in each year. The price of crude gypsum as quoted by the Canadian Chemistry and Process Industries remained at \$2.50 to \$3.50 per ton f.o.b. mine throughout 1943."

Table 229.—Production in Canada, of Gypsum, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
	tons	\$	tons	\$
SHIPMENTS BY GRADES—				
Crude (a)—Lump or mine run.....	13,176	22,240	9,277	18,632
Crushed.....	402,578	523,093	276,498	403,406
Fine ground.....	246	1,849	719	6,070
Calcined gypsum, sold and used (b).....	150,166	707,000	160,354	953,360
Total.....	566,166	1,254,182	446,848	1,381,468
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	394,216	512,762	255,736	368,639
New Brunswick.....	36,623	111,316	36,263	148,315
Ontario.....	82,796	304,170	92,448	335,637
Manitoba.....	29,218	179,780	37,989	380,529
British Columbia.....	23,313	146,154	24,412	143,348
Total.....	566,166	1,254,182	446,848	1,381,468
Total gypsum mined and quarried (a).....	797,126		430,822	
Total gypsum calcined (b).....	183,296		201,168	

(a) Includes some anhydrite quarried in Nova Scotia in 1942.

(b) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary, but includes calcine used in manufacturing plants operated in direct conjunction with the mines—the value of calcine used is its value as a process material.

Table 230.—Production (Sales) of Crude and Calcined Gypsum in Canada, 1934-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	461,237	863,776	1939.....	1,421,934	1,935,127
1935.....	541,864	932,203	1940.....	1,448,788	2,065,933
1936.....	833,822	1,278,971	1941.....	1,593,406	2,248,428
1937.....	1,047,187	1,540,483	1942.....	566,166	1,254,182
1938.....	1,008,799	1,502,265	1943.....	446,848	1,381,468

Table 231.—Consumption of Gypsum in Canadian Cement Industry, 1932-1943

Year	Tons	Year	Tons
1932.....	27,538	1938.....	51,975
1933.....	13,319	1939.....	31,492
1934.....	19,172	1940.....	38,903
1935.....	21,611	1941.....	49,031
1936.....	25,447	1942.....	49,816
1937.....	33,691	1943.....	47,034

Table 232.—Imports and Exports of Gypsum, 1942 and 1943(X)

	1942		1943	
	Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$
IMPORTS—				
Gypsum, crude (sulphate of lime).....			5,000	12,490
Gypsum, ground, not calcined.....	717	22,692	490	16,828
Plaster of Paris and wall plaster.....	1,404	49,120	1,202	47,532
Total.....		71,812		76,850
EXPORTS—				
Gypsum or plaster, crude.....	489,842	544,094	185,210	213,022
Plaster of Paris, wall plaster.....	213	4,902	478	8,844
Gypsum, ground.....	25	260		
Total.....		549,256		221,866

(x) Subject to revision.

Table 233.—Principal Statistics of the Gypsum Mining Industry in Canada, 1939-1943

	Nova Scotia	New Brunswick, Ontario, Manitoba, British Columbia	Total Canada
Number of firms—1939.....	7	3(a)	10
1940.....	6	3(a)	9
1941.....	6	2(a)	8
1942.....	5	2(b)	7
1943.....	4	2(b)	6
Capital employed—1939.....	\$ 4,370,893	2,436,014	6,806,907
1940.....	\$ 2,406,561	2,242,101	4,648,662
1941.....	\$ 2,812,465	2,363,356	5,175,821
1942.....	\$ 1,913,131	2,473,400	4,386,531
1943.....	\$ 2,508,778	2,638,646	5,147,424
Number of employees—On salary—			
1939.....	29	37	66
1940.....	33	24	57
1941.....	34	14	48
1942.....	28	27	55
1943.....	19	32	51
On wages—			
1939.....	440	208	648
1940.....	389	248	637
1941.....	328	272	600
1942.....	201	254	455
1943.....	99	288	387
Salaries and wages—Salaries—			
1939.....	\$ 53,680	59,235	112,915
1940.....	\$ 60,374	51,048	111,422
1941.....	\$ 62,083	28,852	90,935
1942.....	\$ 53,314	53,163	106,477
1943.....	\$ 38,299	78,418	116,717
Wages—			
1939.....	\$ 402,134	177,109	579,243
1940.....	\$ 369,090	237,154	606,244
1941.....	\$ 338,356	315,717	654,073
1942.....	\$ 231,431	319,712	551,143
1943.....	\$ 94,588	406,475	501,063
Fuel and electricity cost—			
1939.....	\$ 90,394	103,094	193,488
1940.....	\$ 76,224	118,740	194,964
1941.....	\$ 73,784	148,780	222,564
1942.....	\$ 36,831	141,851	178,682
1943.....	\$ 22,919	179,061	201,980
Value of process supplies used—			
1939.....	\$ 85,166	20,665	105,831
1940.....	\$ 194,005	29,370	223,375
1941.....	\$ 199,875	29,589	229,464
1942.....	\$ 34,784	30,673	65,457
1943.....	\$ 11,234	34,829	46,063
Selling value of products (gross)—			
1939.....	\$ 1,340,830	594,297	1,935,127
1940.....	\$ 1,302,347	763,586	2,065,933
1941.....	\$ 1,517,297	731,131	2,248,428
1942.....	\$ 512,762	741,420	1,254,182
1943.....	\$ 368,639	1,012,829	1,381,468

(a) Includes 2 companies also operating in Nova Scotia.

(b) Includes 1 company also operating in Nova Scotia.

Table 234.—Capital Employed in the Gypsum Industry in Canada, by Provinces, 1943

Capital employed as represented by:	Nova Scotia	New Brunswick, Ontario, Manitoba and British Columbia	Canada
	\$	\$	\$
Present cash value of the land (excluding minerals).....	510,987	425,274	936,261
Present value of buildings, fixtures, machinery, tools and other equipment.....	788,913	549,425	1,339,338
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	93,654	94,566	188,220
Inventory value of finished products on hand.....	430,807	54,750	485,557
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	684,417	1,523,631	2,208,048
Total	2,508,778	2,638,646	5,147,424

Table 235.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1942-1943

Month	1942		1943				
	Mine	Mill	Mine			Mill	
			Surface		Under-ground (x)	Male	Female
			Male	Female			
January.....	194	173	68	1	83	147	4
February.....	210	184	74	1	88	144	3
March.....	266	201	83	1	82	152	5
April.....	270	215	87	5	85	144	8
May.....	336	224	93	6	82	155	10
June.....	331	240	112	3	82	161	9
July.....	345	226	136	3	78	168	14
August.....	338	227	172	3	69	159	20
September.....	268	184	159	3	74	175	24
October.....	188	169	162	3	71	176	22
November.....	191	166	177	3	79	181	18
December.....	157	141	186	3	79	172	18

(x) Underground work confined to New Brunswick, Ontario and Manitoba.

(2) The Gypsum Products Industry

Nine Canadian factories, operated by 4 companies, manufactured gypsum products having a factory selling value of \$5,417,045 during 1943. This output was 12 per cent over the 1942 total of \$4,829,962. The main products were gypsum wallboard, gypsum hardwall plaster, gypsum tile and gypsum blocks.

Capital employed in these 9 manufacturing plants amounted to \$4,092,304 in 1943, including \$1,482,430 as the value of buildings and equipment, \$536,959 as the value of inventories at the year-end, and \$2,072,915 as cash, bills receivable, etc. The average number of employees in 1943 was 436, to whom \$632,212 were paid in salaries and wages. Expenditures for fuel and electricity amounted to \$307,748 while materials used in manufacturing processes cost \$2,707,124.

Table 236.—Materials Used in the Gypsum Products Industry, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Gypsum, crude.....	ton	20,742	78,460	17,489	86,774
Gypsum, calcined (plaster of Paris).....	ton	149,885	705,541	162,273	972,550
Paper.....	ton	14,240	868,457	16,104	1,032,802
Starch or paste.....	ton	499	31,488	605	40,669
Hair.....	ton	75	18,036	52	13,274
Retarder.....	ton	203	18,045	171	15,099
Sawdust and shavings.....	ton	165	2,259	162	2,269
Containers, etc.....			108,587		77,303
All other materials.....			420,561		466,384
Total.....			2,251,434		2,707,124

Table 237.—Output of the Gypsum Products Industry, 1942 and 1943

Product	Unit of measure Quantity	1942		1943	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	164,410,695	3,849,253	192,185,195	4,317,946
Gypsum hard wall plasters.....	ton	51,475	882,528	39,883	501,104
All other products (x).....			298,181		597,995
Total.....			4,829,962		5,417,045

(x) Includes gypsum tile and blocks, etc.

IRON OXIDES (OCHRE) MINING INDUSTRY

Production (producers' sales) in Canada of ochreous iron oxides during 1943 totalled 8,401 short tons valued at \$135,893 compared with 9,304 short tons worth \$151,653 in 1942. The output in these years included the mineral in both the crude and refined state. Of the 1943 shipments, 7,998 short tons valued at \$131,057 were made from deposits located in the province of Quebec and 403 short tons worth \$4,836 from British Columbia.

Capital employed by the 5 firms reported as active in the production of iron oxides totalled \$254,891 in 1943; employees numbered 47, and salaries and wages paid amounted to \$46,554. Fuel and electricity used by the industry as a whole during the year under review totalled \$19,438 and the cost of explosives and other process supplies consumed was reported at \$7,590. The maximum period of mining operations as reported by any single operator in 1943 was from May 17 to December 11.

The following information relating to Canadian iron oxides is taken from a report prepared by the Bureau of Mines, Ottawa:

"Ochreous iron oxide, which is sold uncalcined and is used chiefly in the purification of illuminating gas, comprises the bulk of the minerals produced under this category. The calcined form of ochreous iron oxide is used in the manufacture of paints. A smaller quantity of natural iron oxides associated with clay-like materials in the form of umbers and siennas is produced in the raw and in the calcined state for use as pigments in paints. The Canadian iron oxide industry is small and the quantity produced shows little change from year to year. Present producing localities have met the requirements of the domestic pigment trade for the cheaper grades for many years. The production for some time past has come mostly from deposits near Trois Rivières, Quebec, but there are other deposits in different parts of Canada that could be operated were the demand sufficient to warrant doing so.

"In 1943 Sherwin-Williams Company of Canada operated deposits at Red Mill and near Champlain, Champlain county, Quebec. It was the only producer of calcined iron oxides, the others having marketed only air-dried products. Its calcined and air-floated mineral products, produced to rigid specifications, are essential for use in the war industries. An additional calcining unit of a new design was put in production in 1943. The shortage of cord wood had become so serious that the operators were faced with the closing of the plant or the rebuilding of the furnaces to utilize other fuels that might be available. It was finally decided to convert the furnaces to the use of bituminous coal as fuel, and this required considerable structural changes in the furnaces, including the installation of underfeed stokers. The problem of the sulphur gases (SO_2 and SO_3) from the use of bituminous coal was satisfactorily solved and the furnaces are now operating as efficiently as with fuel, with the added advantage that pyrometric control of the furnace heats can be adapted to stoker firing with coal, if deemed advisable, which was impossible with wood firing by hand. During 1943 some changes in processing of some of the oxides was made to better fit them for the requirements for war purposes.

"Deposits at Almaville and St. Louis, Champlain county, and at Les Forges, St. Maurice county, were operated by Charles D. Girardin of Yamachiche. Mauricy Oxide Company of Grand'Mère operated its property at St. Adelphe, Champlain county, and Thos. H. Argall of Trois Rivières operated his property near Pointe-du-Lac, St. Maurice county. In the past, deposits near St. Anne de Beaupré, Montmorency county; in Lynch township, Labelle county; and at St. Raymond, Portneuf county, Quebec, were operated.

"In British Columbia, there has been a small production of iron oxide from Alta Lake, New Westminster district, and from oxide beds in the Windermere district, since 1923. The oxide is used chiefly for gas purification.

"In Alberta and Saskatchewan, several deposits of ochre are known, some of which have commercial possibilities, but they are difficult of access and the market is limited and they have received little active attention. Large deposits near Grand Rapids and Cedar Lake in northern Manitoba remain undeveloped for similar reasons. In Nova Scotia, beds of ochre and umber were operated to a small extent in the past."

The Canadian price of red iron oxide in 1943 as given by Canadian Chemistry and Process Industries remained at 2 to 7 cents a pound throughout the year.

Table 238.—Production (Sales) in Canada of Iron Oxides, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
		\$		\$
Quebec*	8,866	147,049	7,998	131,057
British Columbia	438	4,604	403	4,836
Total	9,304	151,653	8,401	135,893

* Includes crude and refined grades.

Table 239.—Production of Iron Oxides in Canada, 1927-1943

Year	Quantity	Value	Year	Quantity	Value
	Short tons	\$		Short tons	\$
1927	6,125	103,536	1936	5,854	69,630
1928	5,414	111,198	1937	6,197	83,640
1929	6,518	115,932	1938	5,821	71,769
1930	6,596	83,873	1939	6,015	88,418
1931	5,520	49,205	1940	9,979	111,874
1932	5,240	46,161	1941	10,045	142,069
1933	4,357	53,450	1942	9,304	151,653
1934	4,959	66,166	1943	8,401	135,893
1935	5,516	77,075			

The production of iron oxides in Canada since the first recording of statistics in 1886 to the end of 1943 totalled 325,114 short tons valued at \$3,409,453.

Table 240.—Consumption of Iron Oxides in Specified Canadian Industries, 1932-1943

Year	Coke and gas		Paints, pigments and varnishes		Paints, pigments and varnishes	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons (b)	\$	Tons (c)	\$
1932	3,736	35,284	701	52,323	512	49,047
1933	2,734	29,076	504	43,826	491	43,671
1934	3,757	47,010	580	53,539	544	53,236
1935	3,701	46,204	990	77,758	564	56,219
1936	(d)	41,291	733	67,850	634	65,819
1937	(d)	40,414	890	81,709	566	49,082
1938	(d)	41,013	822	70,736	487	41,062
1939	(d)	35,417	882	80,274	523	46,134
1940	5,417	42,491	1,146	112,826	575	62,636
1941	5,133	36,480	1,602	187,836	464	58,385
1942	4,600	33,790	2,334	253,383	412	52,155
1943	6,568	45,946	2,321	222,858	440	68,425

(a) Oxide and purifying materials.

(b) Iron oxide pigments.

(c) Ochres, siennas and umbers.

(d) Data not available

Imports into Canada of ochres, ochrey earths and siennas totalled 2,250,850 pounds valued at \$76,644 in 1943 compared with 2,067,212 pounds worth \$61,488 in 1942. Exports from Canada of iron oxide in 1943 totalled 3,661,200 pounds valued at \$131,830 as against 6,990,100 pounds at \$237,479 in 1942.

Table 241.—Principal Statistics of the Natural Iron Oxides Industry in Canada, 1941-1943

	1941	1942	1943
Number of firms.....	(a) 4	(d) 5	(d) 5
Capital employed..... \$	189,877	194,541	254,891
Number of employees—On salaries.....	(c) 6	(e) 6	(b) 7
On wages.....	37	41	40
Total.....	43	47	47
Salaries and wages—Salaries..... \$	8,571	9,174	10,293
Wages..... \$	33,581	35,114	36,261
Total..... \$	42,152	44,288	46,554
Selling value of products (gross)..... \$	142,069	151,653	135,893
Cost of fuel and purchased electricity..... \$	15,697	20,835	19,438
Cost of process supplies..... \$	5,697	5,780	7,590
Selling value of products (net)..... \$	120,675	125,038	108,865

(a) Three producing in Quebec and one in British Columbia.

(b) Three females.

(c) One female.

(d) Four producing in Quebec and one in British Columbia.

(e) Two females.

Table 242.—Capital Employed in the Iron Oxides Industry in Canada, 1943

	\$*
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of land (excluding minerals).....	37,776
Present value of buildings, fixtures, machinery, tools and other equipment.....	130,494
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	53,804
Inventory value of finished products on hand.....	27,917
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	4,900
Total.....	254,891

* Quebec only; data for 1 property in British Columbia not available.

Table 243. Wage-Earners(*) Employed, by Months, 1942 and 1943

Month	Number				Month	Number			
	1942		1943			1942		1943	
	Mine	Mill	Mine	Mill		Mine	Mill	Mine	Mill
January.....	2	24		31	July.....	30	28	32	24
February.....		29		31	August.....	25	28	36	21
March.....		33		31	September.....	23	28	27	22
April.....	6	28		31	October.....	14	24	9	23
May.....	8	27	9	22	November.....	10	27	6	26
June.....	31	25	20	23	December.....	10	26	7	25

* No underground work and no female wage-earners.

THE MICA MINING INDUSTRY

Canadian production (primary shipments) of mica in 1943 totalled 8,050,692 pounds valued at \$553,856 compared with 6,019,671 pounds worth \$383,567 in 1942. The value of the 1943 production established an all-time high record and the quantity was only exceeded in the years 1924 and 1929. Of the total output in 1943, Ontario mines contributed 4,254,019 pounds valued at \$266,189, Quebec mines, 3,086,673 pounds worth \$245,816 and British Columbia 710,000 pounds at \$11,821. These statistics of mica production include shipments of all classes, grades and varieties of the mineral, including phlogopite and muscovite. In 1943 mica statistics were compiled according to a new classification comprising rough mine-run or rifted; mica sold for mechanical splitting; splittings; ground or powdered; scrap (mine or shop waste and mica mined and sold for grinding); flake (mica schist); natural or recovered by milling; and trimmed mica. These classes replaced the older classification of hand cobbled, thumb trimmed, splittings, knife trimmed, scrap, ground and mica schist.

The number of Canadian primary mica producers reporting commercial shipments in 1943 totalled 71; capital employed amounted to \$458,402, and \$357,992 were distributed in salaries and wages to 430 employees. The total net value of shipments was estimated at \$499,461.

Table 244.—Production of Mica in Canada, by Grades, 1941 and 1942
(old classification)

	1941			1942		
	Quantity	Value, f.o.b. shipping point	Price per pound	Quantity	Value, f.o.b. shipping point	Price per pound
	Pounds	\$	\$	Pounds	\$	\$
Rough cobbled.....	169,315	25,977	0-15	362,600	40,055	0-11
Knife-trimmed.....	264,409	144,356	0-55	264,858	177,628	0-67
Thumb-trimmed.....	139,577	19,738	0-14	67,292	19,334	0-29
Splittings.....	184,830	121,879	0-66	165,610	102,666	0-62
Scrap (*).....	2,729,760	23,338	0-009	5,159,311	43,884	0-009
Total.....	3,487,891	335,288		6,019,671	383,567	

(*) Includes ground mica.

Table 245.—Mica Production(†) (Primary Sales) in Canada, by Classes, 1943
(New Classification)

Class	Pounds	Total value f.o.b. shipping point
		\$
Rough, mine-run or rifted.....	1,429,365	54,450
Mica sold for mechanical splitting.....	190,209	26,048
Splittings.....	73,691	53,820
Ground or powdered.....	(*) 6,065,551	63,210
Scrap: Mine or shop waste and mica mined and sold for grinding.....		
Flake (mica schist): Natural or recovered by milling.....	291,876	356,328
Trimmed mica.....		
Total Mica shipments.....	8,050,692	553,856

(†) Includes both amber and muscovite micas.

(*) Includes 60,591 pounds of unspecified valued at \$1,864.

Table 246.—Production (Sales) of Mica in Canada, by Provinces, 1942 and 1943

	1942		1943	
	Pounds	Value	Pounds	Value
		\$		\$
Quebec.....	2,657,044	285,263	3,086,673	245,846
Ontario.....	2,800,627	89,243	4,254,019	296,189
British Columbia.....	562,000	9,061	710,000	11,821
Total.....	6,019,671	383,567	8,050,692	553,856

Table 247.—Production(x) of Mica in Canada, 1932-1943

Year	Short tons	\$	Year	Short tons	\$
1932.....	309	6,828	1938.....	519	80,939
1933.....	944	49,284	1939.....	1,068	147,321
1934.....	998	97,071	1940.....	975	237,145
1935.....	628	82,038	1941.....	1,743	335,288
1936.....	801	74,556	1942.....	3,010	383,567
1937.....	945	133,731	1943.....	4,025	553,856

(x) Sales.

The total value of mica produced in Canada from the first official recording of mica statistics in 1886 to the end of 1943 amounted to \$9,351,526.

Table 248.—Imports and Exports of Mica, 1942 and 1943

	1942		1943	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Mica and manufactures of, n.o.p.....		177,695		220,356
Vermiculite, crude.....		12,163		18,482
EXPORTS—				
Mica, rough and trimmed.....	484,700	224,481	863,100	422,710
Mica, scrap and waste.....	4,323,800	27,167	4,279,500	34,660
Mica splittings.....	148,300	112,756	65,900	47,108
Mica plate and manufactures.....		18,091		16,540
Total Mica Exports.....		382,495		521,018

Table 249.—Consumption of Mica in Canada, by Industries, as Reported to the Annual Census of Industry, 1942 and 1943

	1942		1943	
	Quantity	Cost at works	Quantity	Cost at works
	Tons	\$	Tons	\$
In Electrical Apparatus Industry.....	102	180,740	145	324,919
In Rubber Industry.....	112	10,960	112	12,314
In Roofing (a).....	436	25,340	395	23,160
In Mica Manufacturing Industry.....	196	35,151	36	41,050
Total accounted for.....		252,191		401,443

(a) Includes mica used in manufacture of wall paper.

The following information is taken from a report "Mica in 1943" as prepared by the Bureau of Mines, Ottawa:

"Canada and the island of Madagascar are the two chief sources of phlogopite, or amber mica, and there is also a small production from recently discovered deposits in Mexico. Deposits of phlogopite occur also in Ceylon, Korea, Tanganyika and Portuguese East Africa and the discovery of occurrences of phlogopite in the Northern Territory of Australia was reported recently. The known occurrences of phlogopite in Canada are confined chiefly to a belt of rocks extending from Kingston to Ottawa and thence northward into Quebec between the Gatineau and Lièvre Rivers. The belt is from sixty to seventy miles wide. Scattered deposits occur also in Pontiac and Argenteuil counties, Quebec, and as far east as Quebec City; and in Ontario similar deposits have been mined in Hastings and Haliburton counties. In recent years most of the Canadian production of phlogopite has come from mines in Quebec, though substantial quantities of scrap have been shipped from waste dumps of idle properties in Ontario.

"There are many known occurrences of muscovite, or white mica, in Canada, but prior to the discovery of important deposits in the Eau Claire area near Mattawa, Ontario, in the winter of 1941-42, production was negligible, as, in general, the quantity of the mica and the yield proved to be too low for profitable mining. In 1943, there was a large production from deposits in the Eau Claire area, chiefly from the Purdy property, a conspicuous feature of the mica being the phenomenal size of the crystals, or books, some of which measured up to 5 by 8 feet across. The average size of trimmed sheet produced here is far above that of most mica mines.

"Muscovite of 'ruby' quality was found a few years ago in the Saguenay district, Quebec, where there was a small production in 1942 and 1943, most of which came from the Simard mine, Bergeronnes township. A small quantity of heavily spotted muscovite was shipped out by aeroplane from a remote locality near Lac Manouan, in the Peribonka River region, north of St. John.

"There are a number of muscovite occurrences in British Columbia mainly in the Tete Jaune, Big Bend, and Fort Grahame areas. Small quantities of mica were recovered from some of these deposits years ago, but many of the deposits are located above timber line, and they could be operated only during the summer. Some mica, or sericite schist, has been mined in recent years at Baker Inlet, near Prince Rupert; this was shipped to a grinding plant in Vancouver for local roofing use. There were no shipments in 1943, however. Scrap mica mined near Oliver, south of Penticton, in the Osoyoos mining division, was ground in Vancouver in 1943.

"Black mica (biotite) occurs near Bancroft, in Hastings county, Ontario, and the deposit has been operated on a small scale for the production of grinding scrap. The mica occurs in very large sheets, but is mostly of poor splitting quality and is too high in iron for general electrical use, though some of it has been used in low voltage domestic heater appliances. The deposit was operated in 1943 and a small tonnage was shipped to the United States for grinding.

"Since 1940, permit licences have been required for the export of all mica and mica products. These are obtainable from the Export Permit Branch, Department of Trade and Commerce, Ottawa. In September, 1943, this restriction was lifted in respect to scrap and waste consigned to the United States.

"No recent figures for world production of mica are available. India has long been the chief source of supply of muscovite, and its production in 1942 and 1943 exceeded all previous records. Indian 'ruby' muscovite, obtained from Bihar Province, has long been the world standard for exacting electrical uses, particularly for magneto and radio condenser films. India also supplies green muscovite, produced in Madras.

"Muscovite and phlogopite sheet mica are used almost entirely for electrical insulation. They are cut or punched into a great variety of shapes and sizes, and in the form of splittings are bonded and pressed into large sheets that can be sawn, bored, and machined into any desired form; splittings are also similarly bonded and layered with paper, cambric, or silk to form flexible "micafolium" and tape insulation for windings and bars. Some clear mica, mostly muscovite, is used as stove windows and in lighting equipment, and there is a limited demand for special large-sized, flawless sheet for use in marine compass dials, boiler gauges, and in the iniconoscopes of television transmitters. Both muscovite and phlogopite are essential in the manufacture of aviation sparkplugs; the latter for the nosewashers at the base of the plug, which are required to possess high heat-resistance, and the former, in the shape of washers, for the barrel, and as thin sheets (so-called "cigarette mica") for the spindle-wrapping and radio shield.

"Fine flake or powdered mica, made mainly from muscovite, but also from phlogopite and even biotite, has become an important industrial product, particularly in the United States where a number of plants are engaged in its manufacture by wet and dry systems of grinding. The raw material is, variously, mine and shop waste or scrap, small sheets and flakes recovered from clay-washing plants and also from schist rock mined for the purpose. In a few cases pegmatites also are mined as a source of grinding mica. Most of the production goes to the roofing and rubber trades. Other uses are in weather and corrosion-resistant paints; in resin varnishes for coating foodstuff cans; as a decorative medium in wallpaper and for Christmas tree "snow"; in the ceramic type of insulation termed "Mycalex"; and in a wide range of resin-bonded, moulded insulation and plastics. "Watsonite" is a flexible, resin-bonded insulating material made with dehydrated, heat-treated mica powder. Ground mica is also employed as a mould and core wash (trade-name "Micawash") in foundry work. Important new outlets for coarser grades are developing for use in oil drilling to prevent circulation loss of water into uncased and porous formations.

"Vermiculite is used extensively for thermal and acoustic insulation. The expanded product, also termed "Zonolite", has a specific gravity of only 6 to 8 pounds per cubic foot, is comparatively refractory, and has low thermal and sound conductivity.

"Most of the world supply of vermiculite is produced and used in the United States, where production in 1943 totalled 46,645 tons valued at \$471,595. Montana, Wyoming, and North Carolina furnish most of the output, but some has been mined also in Colorado, South Carolina, California, and Nevada. There are no known occurrences of vermiculite (an altered phlogopite or biotite) in Canada.

"Dealers' quotations for phlogopite in 1943 showed little change from 1942 and were approximately as shown below, according to quality as based on colour, hardness, and splitting properties.

Knife-trimmed Block or Sheet		Splittings	
Size, Inches	Per Pound	Size, Inches	Per Pound
1 x 1 and 1 x 2	\$0.25 to \$0.30	1 x 1	\$0.65
1 x 3 and 2 x 2	0.45 to 0.50	1 x 2	0.75
2 x 3	0.70 to 0.80	1 x 3	0.90
2 x 4	0.95 to 1.00		
3 x 5	1.50 to 2.00	(Splittings prices in U.S. funds)	
4 x 6	1.75 to 2.50		
5 x 8	2.75 to 3.25		

"Ground phlogopite sold as follows, according to fineness: 20 mesh, \$30 per ton; 60 mesh, \$40; 150 mesh, \$65; all prices f.o.b. Ottawa, in ton lots, bags extra. Scrap phlogopite, for export sold for \$10 to \$11 per short ton, in carload lots.

"There is comparatively little domestic demand for block muscovite, most of the consumption being in the form of splittings for micanite manufacture, prepared films for condensers, and punched disks, segments, and washers, most of which are imported. There are thus no established trade quotations for trimmed sheet muscovite, and little is handled by Canadian mica dealers. The scale of prices set up by Colonial Mica Corporation for Canadian muscovite in 1942 was revised upward in 1943, except for No. 3 quality, which remained unchanged. The new schedule, which is to remain in effect until December 31, 1944, is shown below. All mica must be prepared in full sickle-trimmed form, with bevelled edges, no sheets to be thinner than 0.007 inch, or 7 mils. Purchase will be made subject to inspection and appraisal for quality and perfection of trim, and the proportion of No. 3 quality under 6 by 8 inches in size is limited to two-thirds by weight of the combined amount of No. 1 and No. 2 mica in any one lot. Prices shown are in Canadian funds, f.o.b. shipping point.

Size or grade inches	No. 1 quality \$	No. 2 quality \$	No. 3 quality \$
1 x 1	1.54	0.66	0.33
1½ x 1½	2.09	0.88	0.44
1½ x 2	2.75	1.485	0.77
2 x 2	4.125	2.31	1.21
2 x 3	5.225	2.97	1.54
3 x 3	5.775	3.41	1.76
3 x 4	6.16	3.96	2.09
3 x 5	6.60	4.62	2.42
4 x 6	7.70	5.17	2.75
6 x 8	8.80	6.05	3.19
8 x 10	11.00	8.25	4.40
10 x 12	13.20	9.90	5.28

"Prices set for 'thins' (under 7 mils) ranged from \$0.50 to \$2.50 per pound, according to size and quality.

"Domestic outlets for limited amounts of No. 3 quality muscovite exist with manufacturers of heater appliances, electrical repair shops, stove manufacturers, and the hardware trade, but such material is in ample supply and prices offer little encouragement for mining for this quality alone.

"Montana cleaned and screened crude vermiculite was quoted in 1943 at \$12 a short ton, f.o.b. mine, and North Carolina crude at \$9.50. The expanded product weighs only 6 pounds per cubic foot, as compared with 60 pounds for the natural mineral. It is usually marketed in 24-pound bags, and American quotations average \$75 to \$80 a ton f.o.b. plant. Value of sales in the United States in 1942 was over \$4,000,000."

Table 250.—Principal Statistics of the Mica Mining Industry in Canada, 1942 and 1943

	1942		1943	
	Canada (*)	Quebec	Ontario	Canada (*)
Number of firms or operators.....	(a) 106	59	17	(b) 78
Capital employed.....	\$ 1,460,769	243,356	215,046	458,402
Number of employees—On salary.....	35	20	19	39
On wages.....	326	185	206	391
Total.....	361	205	225	430
Salaries and wages—Salaries.....	\$ 45,145	27,137	30,170	57,307
Wages.....	\$ 213,460	150,136	150,549	300,685
Total.....	\$ 258,605	177,273	180,719	357,992
Selling value of products (gross).....	\$ 383,567	245,846	296,189	553,856
Cost of fuel and electricity.....	\$ 18,152	18,991	5,766	24,757
Cost of process supplies used.....	\$ 19,161	22,959	6,679	29,638
Selling value of products (net).....	\$ 346,254	203,896	283,744	499,461

(*) Does not include general statistics for 2 operating plants in British Columbia in 1943 for which data are not available, also 2 in British Columbia in 1942.

(a) Includes 96 producing.

(b) Includes 71 producing.

Table 251.—Capital Employed in the Mica Mining Industry in Canada, by Provinces, 1943

	Quebec	Ontario	Canada†
	\$	\$	\$
CAPITAL EMPLOYED AS REPRESENTED BY—			
Present cash value of the land(excluding minerals).....	22,280	63,810	86,090
Present value of buildings, fixtures, machinery, tools and other equipment.....	124,238	45,895	170,133
Inventory value of minerals on hand, ore in process, fuel and miscellaneous supplies on hand.....	31,425	15,668	47,093
Inventory value of finished products on hand.....	920	22,222	23,142
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)...	64,493	67,451	131,944
Total.....	243,356	215,046	458,402

† Data for 1 property in British Columbia not available.

Table 252.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1942 and 1943

Month	1942				1943			
	Mine		Shop(*)		Mine		Shop(*)	
	Surface	Under-ground	Male	Female	Surface	Under-ground	Male	Female
January.....	67	52	85	59	94	40	55	68
February.....	63	50	89	51	84	39	53	85
March.....	66	43	87	51	100	36	72	103
April.....	78	41	81	43	107	33	79	113
May.....	99	42	78	45	114	29	61	106
June.....	102	45	80	51	163	29	80	122
July.....	120	52	95	52	156	23	66	159
August.....	133	46	100	77	138	27	64	157
September.....	127	41	94	73	132	35	56	133
October.....	130	61	74	75	129	37	62	267
November.....	133	54	74	133	102	31	64	312
December.....	100	46	71	139	104	30	60	282
Average.....	108	53	89	76	130	33	69	159

(*) Includes outside workers.

PEAT INDUSTRY

The Canadian peat industry comprises both firms producing peat as a fuel and peat moss and humus for various other purposes. During 1943 production of peat fuel totalled 782 short tons valued at \$7,000 compared with 172 tons worth \$1,204 in 1942. Of the 1943 output, 522 tons valued at \$4,440 originated in the province of Quebec and 260 tons worth \$2,560 in Ontario. For many years past a small tonnage of peat has been produced in the St. Hyacinthe, St. Isidore and Ste. Barbe districts of Quebec for use locally as domestic fuel. The blocks of peat, dug manually with spades, are stocked and air-dried on the ground during the warm, dry season of the year and stored under cover for winter use. They form a compact and efficient fuel, slightly higher in calorific value than wood. To encourage the establishment of a peat-fuel industry in the province, the Quebec Department of Mines has developed a machine for manufacturing peat fuel; it is a modification of the "Dolberg" machine which has been used extensively in Europe. In 1943 the marked increase in the production of machine peat fuel in Quebec was the result of the assistance given by the Provincial Department of Mines and the Emergency Coal Production Board. During the year under review machine-peat fuel was produced in Ontario at Gods Hill near Stratford and at Osgoode, near Ottawa; a small amount of hand-dug peat fuel was used locally at Morewood in Dundas county.

Commercial production of peat moss in Canada during 1943 totalled 64,360 short tons valued at \$1,461,422 (less cost of containers) compared with a corresponding output of 53,506 tons worth \$1,069,372 in 1942. Of the 1943 shipments, 990 tons were made from New Brunswick properties, 14,398 tons from Quebec, 11,120 tons from Ontario, 2,042 tons from Manitoba, 55 tons from Alberta and 35,755 tons from British Columbia. Total Canadian production of moss in 1943, according to grades, were 24,790 tons valued at \$444,488 for horticultural use; 140 tons at \$3,260 as insulation; 26,324 tons worth \$657,697 as poultry and stable litter; 12,974 tons at \$347,900 for metallurgical purposes and 132 tons valued at \$8,077 unspecified. Included in the tonnage classified under Horticulture was a considerable quantity of humus utilized in the manufacture of fertilizer. Products were marketed in the form of bales, bags, pads, fertilizer and insulation manufactures. The value of packing material or containers totalled \$224,022. Canadian moss sold for metallurgical purposes was for consumption in the United States in the manufacture of magnesium metal.

The number of firms reported as active in the production of peat moss and peat fuel or the development of peat bogs totalled 44 in 1943 compared with 35 in 1942. In 1943 capital employed totalled \$2,477,287 and \$1,000,348 were distributed as salaries and wages to 1,012 employees. The net value of production was estimated at \$1,384,770 as against \$1,031,211 in 1942.

Peat is a combustible substance produced by the incomplete decomposition of vegetable matter either in water or in the presence of water, under such conditions that the atmospheric oxygen is excluded. The character of the peat depends upon the conditions under which it was formed, and on the nature of the vegetation which contributed to its formation. Many species of plants are found in peat bogs, the most abundant being mosses, such as sphagnum and hypnum; marsh and heath plants; grasses, rushes, etc.; marine plants; and sometimes trunks, roots and leaves of trees. Peat is found in every province of the Dominion.

Peat moss is the dead moss of the sphagnum plant. It is of importance because of its ability to absorb and hold from 10 to 25 times its own weight of liquids and gasses. It is also elastic and has a low heat conductivity, which makes it a good insulating material.

Prior to the war peat moss was obtained from bogs at Isle Verte, Riviere Ouelle, and Waterville in Quebec; at Grand Valley and Clinton in Ontario; at Edmonton West in Alberta; and at New Westminster, in British Columbia. It was used as a bedding litter for animals, as a filler for fertilizers, for insulating and sound proofing material and as a packing material. Most of the operations were on a relatively small scale and the annual production amounted to only a few thousand tons.

Table 253.—Principal Statistics of the Peat Industry in Canada, 1942 and 1943

	1942	1943
Number of firms.....	(b) 35	(a) 44
Number of plants or bogs.....	35	44
Capital employed.....	\$ 3,212,921	2,477,287
Number of employees—On salary.....	69	64
On wages.....	1,247	948
Total.....	1,316	1,012
Salaries and wages—Salaries.....	\$ 113,781	119,156
Wages.....	\$ 1,266,361	881,192
Total.....	\$ 1,380,142	1,000,348
Selling value of products (gross).....	\$ 1,308,297	1,692,444
Cost of fuel and electricity.....	\$ 25,866	35,118
Process supplies used.....	\$ 13,499	48,534
Cost of containers or packing.....	\$ 237,721	224,022
Selling value of products (net).....	\$ 1,031,211	1,384,770

(a) Includes 12 producing fuel.

(b) Includes one producing fuel.

Table 254.—Capital Employed in the Peat Industry in Canada, by Provinces, 1943

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.	
	\$	\$	\$	\$	\$	\$
Quebec.....	42,155	251,486	65,052	55,807	20,353	434,853
Ontario.....	22,325	185,634	65,356	19,171	29,596	322,082
Manitoba (*).....	3,000	33,978	104,160	1,409	14,000	156,547
British Columbia.....	101,964	613,969	641,091	32,399	174,382	1,563,805
Canada.....	169,444	1,085,067	875,659	108,786	238,331	2,477,287

(*) Includes data for 2 firms in New Brunswick and 1 in Alberta.

Table 255.—Wage-Earners, by Months, 1942 and 1943

Month	1942 Total	1943			
		Bog		Dressing Plant	
		Male	Female	Male	Female
January.....	761	463	5	249	20
February.....	862	464	4	240	25
March.....	850	497	5	172	22
April.....	881	419	5	156	2
May.....	1,038	624	6	210	2
June.....	1,405	901	162	205	7
July.....	2,775	981	171	191	6
August.....	2,297	1,144	231	191	4
September.....	2,212	861	79	246	26
October.....	1,110	530	28	260	20
November.....	950	454	25	306	16
December.....	784	242	19	267	29

Table 256.—Peat Fuel Produced in Canada, 1928-1943 (Tons of 2,000 pounds)

Year	Tons	\$
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761
1936.....	1,341	7,376
1937.....	478	2,676
1938.....	620	3,500
1939.....	445	2,445
1940.....	30	75
1941.....	355	2,155
1942.....	172	1,204
1943.....	782	7,000

NOTE:—For information of a technical nature, please refer to report No. 614 "Facts About Peat" issued by the Bureau of Mines, Ottawa.

Table 257.—Number of Firms, Employees, Salaries and Wages, and Peat (Moss and Fuel) Sold or Used, by Provinces, 1943

Province	Number of firms	Number of employees	Salaries and wages	Fuel, electricity process supplies used and cost of containers	Production		
					Tons of peat sold or used		Value (gross)
					As fuel	Moss	
			\$	\$			\$ (**)
Quebec.....	18	264	179,230	102,314	522	14,398	391,953
Ontario.....	10	116	110,438	48,020	260	11,120	179,893
Manitoba (*).....	5	120	87,074	59,270	.....	3,087	121,256
British Columbia.....	11	512	623,606	98,070	.....	35,755	999,342
Canada.....	44	1,012	1,000,348	307,674	(†) 782	61,360	1,692,444

(*) Contains data for 2 firms in New Brunswick and 1 in Alberta.

(†) Includes 112 tons used by producer.

(**) Includes cost of containers.

Table 258.—Production (Shipments) of Peat Fuel and Peat Moss in Canada, by Uses and Provinces, 1942 and 1943

Province	Fuel		Moss									
	Tons	\$	Horticulture		Insulation		Poultry and stable litter		Metallurgy		Other uses	
			Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1942												
Quebec.....			4,410	74,332	81	2,104	8,491	121,124				12,982
Ontario.....	172	1,204	5,832	89,058	1	46	3,594	58,625				9,427
Manitoba, New Brunswick and Alberta.....			541	8,358	31	542	2,005	58,412				2,577
British Columbia.....			1,288	28,318			3,254	77,392	23,927	549,774	51	3,377
Total.....	172	1,204	12,071	200,066	113	2,692	17,344	313,463	23,927	549,774	51	3,377
1943												
Quebec.....	522	4,440	5,898	126,558	125	2,800	8,375	168,880				14,398
Ontario.....	260	2,580	9,234	85,479			1,886	51,116				11,120
Manitoba, New Brunswick and Alberta.....			808	22,574	15	400	2,264	78,138				3,087
British Columbia.....			8,850	209,877			13,739	359,554	12,974	347,909	132	8,077
Total.....	762	7,000	24,790	444,488	140	3,269	26,324	657,697	12,974	347,909	132	8,077
												1,461,422

(*) Less cost of containers which were valued at \$224,022 in 1943.

NOTE:—Data relating to exports of peat moss from Canada are not shown separately in Canadian trade reports for 1943.

THE SALT INDUSTRY

Production of common salt or natural sodium chloride in Canada during 1943 totalled 687,686 short tons valued at \$4,379,378 compared with 653,672 short tons worth \$3,844,187 in 1942. The quantity and value of the output during the year under review were the greatest ever realized by the Canadian salt industry. The mineral in 1943 was produced in Nova Scotia, Ontario, Manitoba and Alberta, and of the total production, Ontario contributed 594,889 short tons or 86.5 per cent. Statistics of production represent the recovery of salt from brine wells with the exception of Nova Scotia, where the output comes entirely from the underground mining or rock salt deposits.

Of the total salt produced in 1943, there were 346,145 short tons or 50 per cent consumed directly in the manufacture of caustic soda and other chemicals. Producers' sales of other salt in 1943 included 99,706 short tons of table and dairy grades; 167,547 short tons of common fine and 70,883 short tons of common coarse. The balance, other than that used direct for chemical manufacture, consisted of various grades, including salt for agriculture and for highway maintenance.

The number of Canadian firms reporting primary salt production in 1943 totalled 9; capital employed by the industry amounted to \$5,490,594, of which \$3,381,435 represented the value of buildings, machinery, etc., \$284,652 the value of land and \$1,262,469 operating capital. Employees numbered 682, including 105 females. Salaries and wages totalled \$1,223,009; \$596,252 were expended for fuel and electricity, and \$134,272 for chemicals and other process supplies.

Statistics relating to Canadian salt production are available only since 1886 and salt output in the Dominion since that year and to the end of 1943 totalled 10,780,904 short tons valued at \$62,293,839. Statistics relating to world production of salt have not been available since 1938.

Canadian exports of salt in 1943 totalled 8,061 short tons valued at \$118,174; imports during the same period amounted to 84,788 short tons worth \$589,108.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"At Nappan, near Amherst, Cumberland county, Nova Scotia, a well was drilled in 1931 by Imperial Oil, Limited in a search for oil and gas. The hole reached a total depth of 4,134 feet and bottomed in anhydrite. The hole penetrated alternating beds of salt, anhydrite, dolomite, limestone, and shale, the salt constituting 45 per cent of the whole. Salt was first met at a depth of 920 feet, for a length of 20 feet, and this was followed by many other salt horizons interbedded in gypsum, anhydrite, and sand. At 2,990 feet, there followed a thickness of 500 feet of salt. The geological structures in this area were worked out in detail by Imperial Oil, Limited.

"To obtain further information on this structure the Nova Scotia Department of Mines undertook a drilling campaign in 1943. No. 1 hole, drilled one mile west of Amherst, intersected 26 feet of salt between 779 feet and 805 feet. No. 2 hole drilled 650 feet north of No. 1 intersected salt at 888 feet and was stopped in salt at 1,114 feet, giving 226 feet of salt. The results of the drilling gave ample evidence of huge deposits of salt in this district.

"In New Brunswick, a salt basin was discovered in 1921, as a result of drilling in the vicinity of Goutreau, south of Moncton, on the east side of the Petitecodiac River. The extent of the basin was further determined when New Brunswick Gas and Oilfields, Limited, in drilling at Weldon on the west side of the Petitecodiac River, penetrated over 1,500 feet of salt formation. It was the second drill hole to strike salt on that side of the river. The top of the rock salt was 1,473 feet below the surface. During 1939 still another drill hole passed through the same salt formation, the thickness, however, being only about 100 feet, indicating that the northern edge of the basin was being approached. Six drill holes have penetrated the salt so that a deposit over 1½ miles wide and 4 or more miles long is already indicated, the greatest thickness so far encountered being 1,500 feet. There are, therefore, many millions of tons of salt in this basin available for future development.

"The market for salt in Canada is steadily increasing. Domestic production is sold principally to the dairy, meat curing, and canning industries; to fisheries; to highway and transport departments for use as a soil stabilizer; to the chemical industries; and as table salt.

"The use of salt in soil stabilization for the foundations of highways and for a surface veneer for gravel roads has shown marked increase in recent years. It has been used extensively also in the development of soil-stabilized bases for runways at Canadian air fields. Sand piled each fall at regular intervals along main highways remains loose and free-flowing even in the coldest weather, when mixed with salt, thus allowing easy distribution on the icy roadway.

"According to Canadian Chemistry and Process Industries (Toronto), prices for the several grades of salt were as follows in 1943: Specially purified (99.9 per cent NaCl) from January to July, and 94 cents per 100-pound lot from July to the end of the year; salt in 280-pound barrels f.o.b. plant, \$3.53 per barrel; industrial fine, in bulk car lots f.o.b. plant, \$6.53 per ton; and industrial coarse \$10.63 per ton."

Table 259.—Production of Salt in Canada, by Grades, 1942 and 1943

	1942			1943		
	Manu- factured	Sold	Value of salt sold (Not including containers)	Manu- factured	Sold	Value of salt sold (Not including containers)
	tons	tons	\$	tons	tons	\$
Table, dairy and pressed blocks.....	89,588	87,743	1,698,210	100,562	99,706	1,823,446
Common, fine.....	147,168	150,008	890,906	164,658	167,547	1,074,229
Common, coarse.....	33,794	35,271	330,322	68,106	70,883	451,462
Highway salt.....	996	996	5,438	269	269	1,468
Land salt.....	514	509	3,493	132	157	1,223
Other grades.....	52,239	51,597	335,037	3,044	2,979	43,208
Brine for chemical works (salt equivalent sold or used).....	327,548	327,548	580,781	346,145	346,145	984,342
Total.....	651,847	653,672	3,844,187	682,916	687,686	4,379,378
Value of containers.....			748,816			809,250
Grand Total.....			4,593,003			5,188,628

Table 260.—Production of Salt, by Provinces(*), 1932-1943

Year	Nova Scotia		Ontario		Manitoba		Alberta	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1932.....	31,897	150,708	231,138	1,789,751	508	7,092		
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388		
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137		
1935.....	38,701	161,659	320,003	1,698,608	1,538	18,765		
1936.....	38,774	183,915	350,044	1,557,078	2,498	32,151		
1937.....	46,865	216,401	407,701	1,539,599	3,391	43,465		
1938.....	44,950	194,759	388,130	1,657,140	2,920	34,979	4,045	46,035
1939.....	47,885	213,029	370,843	2,200,189	2,453	35,888	3,319	37,526
1940.....	42,495	220,328	412,401	2,371,780	3,076	45,731	6,742	185,430
1941.....	54,007	307,637	477,170	2,512,168	13,051	115,367	16,617	260,995
1942.....	50,199	317,798	558,407	2,793,328	22,706	397,101	22,360	335,960
1943.....	47,775	245,157	594,889	3,356,870	27,523	497,227	17,499	280,124

(*) In addition, Saskatchewan produced 231 tons valued at \$4,510 in 1933, 452 tons at \$8,703 in 1934, and 101 tons at \$2,046 in 1935.

Table 261.—Salt Produced for Chemical Purposes(*), 1928-1943

Year	Quantity Tons (2,000 lb.)	Per cent of total salt output	Year	Quantity Tons (2,000 lb.)	Per cent of total salt output
1928.....	135,138	45	1936.....	165,882	42
1929.....	168,327	51	1937.....	205,149	45
1930.....	114,737	42	1938.....	170,938	39
1931.....	97,958	38	1939.....	187,958	44
1932.....	96,242	37	1940.....	224,009	48
1933.....	104,740	37	1941.....	258,711	46
1934.....	124,132	39	1942.....	327,548	50
1935.....	145,433	40	1943.....	346,145	50

(*) Used in the manufacture of chemicals by producers of salt.

Table 262.—Production in Canada, Imports, Exports and Consumption of Salt, 1942 and 1943

	1942		1943	
	Tons	Value	Tons	Value
		\$		\$
Production.....	653,672	3,844,187	687,686	4,379,378
IMPORTS—				
Salt, for the use of the sea or gulf fisheries.....	20,865	141,050	21,037	161,255
Salt, in bulk, n.o.p.....	35,295	165,762	47,687	245,013
Salt, n.o.p., in bags, barrels, etc.....	13,182	133,895	16,064	181,940
Salt, table, made by an admixture of other ingredients, when containing not less than 90 per cent of pure salt.....	2	141		
Total.....	69,344	440,848	84,788	539,103
Exports.....	9,326	128,832	8,061	118,174
Apparent consumption of salt.....	713,690	4,156,203	764,413	4,850,312

Caustic soda, chlorine and hydrochloric acid are now manufactured by Canadian Industries Limited from salt obtained from the company's wells located at Sandwich. This company operates chemical plants at Windsor, Cornwall, Shawinigan Falls and Quebec.

The Brunner, Mond Canada, Limited, located at Amherstburg, Ontario, manufactures soda ash from natural brine; calcium chloride is also recovered as a by-product by this company.

Table 263.—Available Statistics on Consumption of Salt in Specified Canadian Industries, 1942 and 1943(*)

Industries	1942		1943	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	44,918,800	460,162	48,349,100	528,320
Slaughtering and meat packing.....	112,575,017	775,059	120,899,226	859,676
Acids, alkalis and salts—Brine (salt content) and dry salt.....	613,076,907	886,119	262,083,273	681,432
Soaps and cleaning preparations.....	4,363,370	22,822	3,864,220	19,203
Dyeing, cleaning and laundry work.....	6,286,284	50,970	6,234,358	56,024
Dyeing and finishing of textiles.....	5,564,143	25,709	7,611,943	33,834
Artificial ice.....	474,440	3,720	549,990	4,516
Abrasives—artificial.....	784,000	4,172	820,000	4,793
Waterworks.....	3,596,200	(†)	4,821,900	(†)
Leather tanneries.....	16,412,227	85,305	16,859,409	88,867
Pulp and paper mills.....	28,606,000	132,161	28,546,000	136,642
Stock and poultry foods.....	8,158,000	63,376	13,386,000	106,991
Bread and other bakery products.....	15,481,319	183,393	16,978,891	199,602
Fruit and vegetable preparations.....	13,212,011	98,254	11,599,260	83,370
Biscuits, confectionery, etc.....	1,894,910	18,615	2,158,560	23,103
Foods, breakfast.....	1,386,367	10,970	3,024,751	18,521
Sausage and sausage casings.....	637,966	7,054	612,884	9,097
Ice cream industry.....	458,925	2,203	393,817	9,806
Breweries.....	1,055,986	8,977	701,867	6,744
Malt and malt products.....	220,500	1,278	305,185	1,729
Macaroni, vermicelli, etc.....	115,602	1,213	136,203	1,447
Ice cream cones.....	6,394	66	8,460	78
Foods, miscellaneous, including coffee, tea, etc.....	2,693,050	27,063	4,110,262	43,447
Butter and cheese.....		240,607		239,184
Starch and glucose.....	623,360	2,625	553,268	2,633
Animal oils and fats.....	364,000	1,850	428,000	2,184
Condensed milk.....		409		330
Cheese processed.....	239,263	4,573	299,809	5,339

(*) In addition, large quantities of salt are used on highways.

(†) Data not available.

Table 264.—Principal Statistics of the Salt Industry in Canada, 1941-1943

	1941	1942	1943
Number of firms (*)	9	9	9
Capital employed			
Number of employees—On salary	\$ 5,559,307	5,687,511	5,490,504
On wages	148	134	135
	520	541	547
Total	668	675	682
Salaries and wages—Salaries	\$ 361,661	337,050	366,555
Wages	656,991	777,524	856,454
Total	\$ 1,018,652	1,114,574	1,223,009
Selling value of products (gross)	\$ 3,852,499	4,604,003	5,188,628
Cost of purchased process materials	69,341	133,783	134,272
Cost of fuel and electricity	450,291	536,649	506,252
Value of containers	656,334	748,816	809,250
Net value of sales	\$ 2,676,533	3,184,755	3,648,854

(*) 6 in Ontario; 1 in Nova Scotia; 1 in Manitoba; 1 in Alberta.

Table 265.—Capital Employed in the Salt Industry in Canada, 1943

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land (excluding minerals)	284,652
Present value of buildings, fixtures, machinery, tools and other equipment	3,381,435
Inventory value of materials on hand, salt in process, fuel and miscellaneous supplies on hand	445,963
Inventory value of finished products on hand	118,075
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	1,262,469
Total	5,490,594

Table 266.—Wage-Earners, by Months, 1939-1943 (On last day of each month or nearest work day)

Month	1939	1940	1941	1942	1943		
					Male		Female
					Surface	Under-ground	Surface
January	440	431	428	515	455	55	35
February	426	439	435	526	447	48	40
March	407	442	449	516	457	42	44
April	424	463	484	522	455	41	41
May	439	490	516	539	460	30	44
June	459	477	543	560	465	31	46
July	460	493	558	565	482	25	55
August	416	503	564	548	480	28	58
September	431	490	565	548	446	30	63
October	458	483	574	542	452	26	63
November	449	492	563	569	458	28	65
December	408	396	556	545	468	29	63
Average	434	466	520	541	461	34	52

POTASH

Complete statistics relating to world production of potash are not available for 1941 or 1942 as publication of potash production statistics by European governments virtually ceased in the summer of 1939, and no adequate data are available since.

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland County, Nova Scotia, and at Gautreau, Westmorland County, New Brunswick. Potassium chloride occurs at Malagash in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite.

Table 267.—Potash Salts Used in the Manufacture of Canadian Mixed Fertilizers, 1942 and 1943

	1942		1943	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Nitrate of potash.....	90	876		
Kainite and potash manure salts.....	30,182	587,489	23,753	447,619
Muriate of potash.....	41,648	1,686,724	51,500	1,969,055
Sulphate of potash.....	4,525	196,754	5,480	248,702

Table 268.—Sales of Potash Salts for Fertilizer Purposes, Other Than For the Manufacture of Mixed Fertilizers, Years Ended June 30, 1942 and 1943

	1942	1943
	(short tons)	
Muriate of potash.....	5,419	5,376
Sulphate of potash.....	122	99

TALC AND SOAPSTONE INDUSTRY

The value of crude and refined talc and soapstone sold by Canadian producers of these minerals totalled \$266,685 in 1943 compared with a corresponding value of \$310,824 in 1942. Mine shipments of soapstone and talc reported in 1943 by operators in the province of Quebec amounted to 14,204 tons worth \$135,469. Production of the higher grades of talc in Canada is confined chiefly to the province of Ontario, and the 1943 shipments totalling 11,959 tons valued at \$131,216 were made almost entirely from a deposit located near Madoc, Hastings county. Included in the Ontario output was a relatively small tonnage of talc obtained from a property situated near Ompah in Frontenac county. In British Columbia, crude talc imported from the United States was treated in a Vancouver mill. From October to December development work was carried on at a talc deposit located at Red Mountain in the Kootenay National Park of British Columbia; this operation is known as the Lava Talc Project and was conducted by the Wartime Metals Corp.; a trial shipment was made to the United States economic Administration.

Imports of talc or soapstone into Canada in 1943 totalled 12,899,800 pounds valued at \$130,813; exports of talc in the same year amounted to 22,729,200 pounds worth \$146,516.

During 1943 there were 8 firms reported as active in the industry, 5 in the province of Quebec, 2 in Ontario and 1 in British Columbia; of these, 6 made commercial shipments. Capital employed by the industry totalled \$576,691; employees numbered 90, and \$101,719 were distributed as salaries and wages. Fuel and purchased electricity consumed were appraised at \$24,104 and the cost of explosives and other process supplies used was reported at \$33,927. The net value of sales in 1943 was estimated at \$208,654 compared with \$251,711 in 1942.

The following information is from a report "Talc and Soapstone in 1943" as prepared by the Bureau of Mines, Ottawa:

"Annual production of ground talc in Canada in the five-year period 1939-1943, inclusive, ranged from 16,000 to 32,000 tons, these figures including also material classed in statistical records as soapstone, part of which was ground in mills other than those of primary producers. All of the output came from Ontario and Quebec.

"Most of the material from Ontario consists of white, foliated talc, which occurs as veins in crystalline dolomitic limestone of the Madoc area, Hastings county, where an established talc industry has existed for the past forty years. Total output from the Madoc area to the end of 1943 is about 400,000 tons. Since 1937, Canada Talc Limited, operating the Conley and Henderson mines, has been the only important producer. W. C. Spry and Company in recent years has been milling a small tonnage of finely schistose, cream-coloured talc in the plant of Canada Slate Products, about a mile north of Madoc. The crude rock is trucked in from a deposit near Ompah, in Frontenac county, 65 miles distant.

"In Quebec, the talc produced is also of foliated type, but it occurs in bands in highly-metamorphosed basic rocks, mainly serpentine and pyroxenite, and is often associated with bodies of soapstone, an impure talcose rock. It contains much iron, present mainly in chlorite, and varies rather widely in carbonate content. It yields a slightly off-colour, grey powder, and is used chiefly in the rubber, paper, and roofing trades. The entire production is obtained from the Eastern Townships, mainly from the Thetford Mines area, and there are also a mine and mill at Highwater close to the Vermont boundary. All of Canada's output of sawn soapstone blocks, sold chiefly for use in the alkali recovery furnaces of domestic kraft mills, and also of talc crayons, comes from the Thetford Mines area. Some of the sawing dust from these operations is sold to domestic roofing firms, and a large tonnage of quarry and sawing waste is shipped to the grinding plant of Pulverized Products, Limited, 4820 Fourth Avenue, Rosemount, Montreal.

"Prior to the war, the world production of talc, including ground material, cut soapstone, steatite, and pyrophyllite (a mineral closely resembling talc and used for many similar industrial purposes) amounted to about half a million tons a year, more than half of which was produced in the United States. Manchuria, with an output of about 100,000 tons, was the second largest producer, followed by France and Italy, each with about 50,000 tons, Norway, British India, Canada and Germany (including Austria).

"Many grades of ground talc are marketed, and the price range is wide. Value is dependent upon purity (determined by freedom from lime and gritty or iron-bearing substances, slip, and colour), particle shape, and fineness of grinding, the specifications for which vary in the different consuming industries. Roofing and foundry tales are the cheapest grades, the trades in these being satisfied with coarser, grey or off-colour material, often soapstone powder or sawing dust, which sells at about \$5 to \$7 a ton f.o.b. rail. Domestic grey talc, suitable for rubber and paper use, sold in 1943 for an average of \$7.50 to \$9 per ton. White talc from the Madoc area was quoted at \$8 to \$10 for the coarser grades, \$12 to \$18 for finer mesh sizes, and \$44 for minus 400-mesh material.

"American tales include high-grade, white Californian material, which sold for \$17.50 to \$43 a ton; fibrous New York 'Asbestine', 'Tremoline', and 'Loomite' grades, which were quoted at \$13 to \$21; and the lower-grade, grey Georgia and Vermont products, which sold for \$8 to \$14; all prices f.o.b. mines. Lava steatite and crayon talc sold for \$100 to \$150 a ton.

"Pyrophyllite (hydrous silicate of alumina) closely resembles talc in appearance and physical characteristics. It is difficult to distinguish from talc even by microscopic means and often requires chemical analysis for its identification. In the ground state it can be employed for many of the industrial uses of talc. Commercial deposits are relatively scarce. Most of the recorded world production comes from North Carolina, where the industry has expanded rapidly in recent years. A large part of the American output goes to the ceramic trade, the remainder being sold for fillers in various products. When fired, pyrophyllite does not flux, as does talc, and it is of value in a wide range of high-grade ceramic products, including refractories.

"Important deposits are known in Newfoundland, and are at present owned and operated by Industrial Minerals Company of Newfoundland, Limited, Box 435, St. John's.

"In 1943, pyrophyllite was quoted at \$10 to \$13 a ton, f.o.b. North Carolina mills, for 200-mesh and 325-mesh material, respectively. The material was in easy supply and was placed throughout the year in Group III of the list of materials issued by the Conservation Division of the United States War Production Board.

"Steatite, is the mineralogical name given to compact, massive talc having no visible grain; that can be sawn, turned, drilled, and otherwise machined into any desired form. Such material has been widely used for the production of fired shapes, used mainly as electrical insulators. There is now a large demand for use as grid spacers in high-frequency ship and tank radio transmitters, and for the cores, bushings, resistors, etc., in radio, radar, and other electronic equipment. It is used to an important extent also for carbon black and other gas burner tips. An alternative trade name for steatite is "lava talc". Because of the small amount of natural steatite available, its high cost, and excessive machining and firing losses, the aforementioned articles are now made largely by die-pressing powdered talc. Suitable talc for the purpose is required to be high-grade material, low in lime and iron, and such talc is now commonly termed steatite, or steatitic talc, irrespective of its texture. There is still a limited demand, however, for sawn steatite shapes, and suitable crude is in short supply. The chief sources of supply at present are British India, Sardinia, Maryland, Montana, and California. Specifications call for compact texture, good structural strength, freedom from hair-cracks and parting lines and from gritty impurities, and a low content of lime and iron. In general, grade and suitability are determined by machinability and firing behaviour, followed by tests for electronic performance. Chemical analysis is of secondary importance."

Table 269.—Production (Sales) in Canada of Talc and Soapstone(†), 1941-1943

	1941		1942		1943	
	Quantity	Value	Quantity	Value	Quantity	Value
	tons	\$	tons	\$	tons	\$
Soapstone (Quebec) (*).....	16,461	155,925	14,369	136,529	14,204	135,469
Talc—Ontario.....	18,171	204,884	15,499	174,295	11,959	131,216
Total Canada.....	34,632	360,809	29,868	310,824	26,163	266,685

(*) Shipments by some firms usually include a considerable quantity of material classified as talc.

(†) Includes both crude and milled grades.

Table 270.—Production of Talc and Soapstone in Canada, 1930-1943

Year	Value	Year	Value
	\$		\$
1930.....	186,216	1937.....	163,814
1931.....	157,083	1938.....	144,848
1932.....	159,038	1939.....	170,066
1933.....	190,836	1940.....	229,639
1934.....	180,777	1941.....	360,809
1935.....	171,532	1942.....	310,824
1936.....	177,270	1943.....	266,685

Production of talc and soapstone in Canada from 1886 to the end of 1943 totalled 577,832 short tons valued at \$5,394,790. The largest annual tonnage produced during these years was 34,632 in 1941, also, the greatest annual value was \$360,809 in 1941.

Table 271.—Consumption of Talc in Canada, by Industries, as Reported in the Annual Census of Manufactures, 1943

Industry	Short tons	Cost at works
		\$
Rubber industry.....	1,839	34,243
Electrical apparatus.....	356	9,891
Paints.....	6,601	174,757
Soaps and cleansing preparations.....	550	10,556
Toilet preparations.....	565	24,868
Polishes.....	25	496
Products from imported clays.....	354	5,586
Prepared roofing.....	3,859	42,519
Pulp and paper.....	1,469	25,178

Table 272.—Imports and Exports of Talc, 1942 and 1943

	1942		1943	
	Pounds	\$	Pounds	\$
IMPORTS—Talc or soapstone.....	10,881,900	114,852	12,899,800	130,813
EXPORTS—Talc.....	32,110,200	214,033	22,729,200	146,516

Table 273.—Principal Statistics of the Talc and Soapstone Industry in Canada, 1941-1943

	1941	1942	1943
Number of firms.....	8(c)	10(a)	8(b)
Capital employed.....	\$ 695,581	\$ 567,665	\$ 576,691
Number of employees—On salary.....	8	8	10
On wages.....	140	107	80
Total.....	148	115	90
Salaries and wages—Salaries.....	\$ 21,564	\$ 22,729	\$ 23,794
Wages.....	\$ 107,256	\$ 90,872	\$ 77,925
Total.....	\$ 128,820	\$ 113,601	\$ 101,719
Selling value of products (Gross).....	\$ 360,809	\$ 310,824	\$ 266,685
Cost of fuel and purchased electricity.....	\$ 26,882	\$ 25,905	\$ 24,104
Cost of explosives and other process supplies.....	\$ 28,324	\$ 33,208	\$ 33,927
Selling value of products (net).....	\$ 305,603	\$ 251,711	\$ 208,654

(a) 7 firms in Quebec and 3 in Ontario; data for a firm in Quebec, other than sales not available.

(b) 5 firms in Quebec, 2 in Ontario and 1 in British Columbia.

(c) 5 firms in Quebec and 3 in Ontario.

Table 274.—Capital Employed, by Classes (x), 1941-1943

	1941	1942	1943
	\$	\$	\$
Present value of land, buildings, fixtures, machinery, tools and other equipment...	590,303	458,036	482,633
Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand.....	18,343	9,465	9,893
Inventory value of finished products on hand.....	8,915	21,385	11,018
Operating capital.....	78,020	78,779	73,147
Total.....	695,581	567,665	576,691

(*) By active firms.

Table 275.—Wage-Earners(x), by Months, 1942 and 1943

Month	Total 1942	1943		
		Surface	Under-ground	Mill
January.....	141	37	21	26
February.....	145	32	21	27
March.....	129	29	21	26
April.....	117	32	17	22
May.....	110	35	19	22
June.....	117	41	17	20
July.....	110	36	15	17
August.....	93	41	18	18
September.....	85	30	18	18
October.....	82	40	16	23
November.....	81	53	20	20
December.....	79	50	17	21

(*) All male.

MISCELLANEOUS INDUSTRIAL OR NON-METAL MINING INDUSTRIES

Included in this section are the following non-metallic minerals and mineral products:—

Barite	Graphite	Phosphate
Brucite	Grindstones	Silica Brick
Corundum	Kyanite	Sodium Carbonate
Diamonds	Lithium Minerals	Sodium Sulphate
Diatomite	Magnesitic Dolomite	Strontium Minerals
Fluorspar	Magnesium Sulphate	Sulphur (Pyrites)
Garnet	Natural Mineral Waters	

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Non-Metal Mining Industry. Minerals or primary mineral products produced (or deposits developed) by this industry during 1943 included barite, brucite, diatomite, fluorspar, graphite, grindstones, lithium minerals, magnesitic dolomite (crude and refined), mineral waters, phosphate, silica brick, sodium carbonate, sodium sulphate and volcanic ash. For convenience, the sulphur content of pyrites shipped and sulphur recovered from smelter gas are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries.

The number of firms reported as active in the industry during 1943 was 52; capital employed totalled \$3,522,842; employees numbered 911 and salaries and wages paid amounted to \$1,363,526. The cost of fuel, purchased electricity, containers and process supplies used during the year was reported at \$1,208,470, and the gross value of production totalled \$3,476,707 compared with \$3,006,167 in 1942.

BARITE

Canadian mine shipments of barite during 1943 totalled 24,474 short tons valued at \$279,253 compared with 19,667 tons worth \$188,144 in 1942. Production of the mineral in both years was confined to the provinces of British Columbia and Nova Scotia and of the 1943 output the latter province contributed 22,550 tons valued at \$263,419. The following information is from a report on barite prepared by the Bureau of Mines, Ottawa.

"The most important development in the history of the industry was the discovery in 1940 of a deposit of exceptional size and richness near Walton, Hants county. This deposit is being actively developed, and since the commencement of operations, three years ago, it has produced about 45,000 tons, or approximately 50 per cent of the total recorded Canadian output.

"Scattered occurrences of barite are known in Ontario, the chief of which are in the Elk Lake, Poreupine, and Sudbury areas. Spasmodic attempts at development have been made, but with limited success and only a small total output.

"In British Columbia, development was commenced in 1941 of a deposit near Parson, 25 miles south of Golden, and this is now supplying a substantial part of the domestic requirements.

"Only Nova Scotia and British Columbia recorded sales of barite in 1943. The fluorspar ores of the Madoc area, Ontario, and of a deposit operated in 1942-1943 at Lake Ainslie, Nova Scotia, contain important amounts of barite. A small tonnage of handpicked barite has been stock-piled at the Lake Ainslie operation. Tests made by the Bureau of Mines, Ottawa, on ores from these two areas indicate the possibility of recovering a marketable barite by-product from them by flotation.

"The barite deposit at Walton, Nova Scotia, shows promise of proving to be one of the largest known world occurrences of the mineral. Preliminary drilling of the property indicated reserves of $1\frac{1}{2}$ million tons to a depth of 200 feet, and this tonnage was increased by further drilling in 1943 to a total of 3,000,000 tons, with one hole showing over 100 feet of barite. The deposit is being operated by Canadian Industrial Minerals, Limited (subsidiary of Springer-Sturgeon Gold Mines, 67 Yonge Street, Toronto), which to date has given chief attention to the production of a 325-mesh product for use in oil-well drilling. Shipments of crude ore have been made to the United States for use in the manufacture of lithopone and barium chemicals. The Walton barite is mostly off-colour material and rather heavily stained by iron, and is thus not suitable for the general pigment and filler trade without bleaching.

"Commercial deposits of witherite (barium carbonate), the only other ore of barium, are rare and no occurrences of economic interest are known in Canada. Most of the world supply has come from England, but in 1942 a small amount was mined in California. American imports in recent years have been running at around 3,000 to 3,500 tons a year.

"World production of barite prior to the war approximated one million tons a year, of which Germany supplied 50 per cent and the United States 30 per cent. The remainder came mainly from the United Kingdom, Italy, Greece, France, and India.

"Ground barite has a number of industrial uses, the chief of which are as a heavy, inert filler or loader in rubber, paper, oilcloth, textiles, leather, and plastics. It is one of the most important pigments and extenders in paints, and it is used extensively as a weighting material in oil drilling muds to overcome gas pressures. In the United States, 66 per cent of the ground and crushed barite sold in 1942 was used in oil-well drilling; 12 per cent in the glass industry, where it serves as a batch fluxing ingredient for moulded flint glass; and 10 per cent in the paint trade.

"For most filler and loader uses, and also for paints, barite is required to contain not less than 95 per cent barium sulphate and to have a good white colour; some off-colour material is also employed for less essential purposes. The best grades of prime white barite are produced by bleaching with sulphuric acid. A 325-mesh material is usually specified. For use in glass, barite must contain not less than 96 per cent barium sulphate, under 3 per cent moisture, and not over 0.4 per cent iron oxide, with a fineness within the range of 20 to 100 mesh. Colour is immaterial in barite for use in oil-well drilling, the requirements for which are a minimum specific gravity of 4.25 (corresponding to a barium sulphate content of 93 per cent) and a grind of 325-mesh. The Walton product more than meets this specification, having an average gravity of 4.40 and a barium sulphate content of 95-96 per cent.

"Large quantities of barite are used in the lithopone and barium chemicals trades. In 1942, consumption of barite for lithopone use in the United States was 32 per cent of the total, and for barium chemicals 23 per cent, the remaining 45 per cent representing ground material employed for oil-well drilling, paints, and general filler and loader use. Barite for use in lithopone should contain not less than 96 per cent barium sulphate and not more than 3 per cent silica and 1 per cent iron (Fe_2O_3). The ore must be crushed to not larger than $1\frac{1}{2}$ inches.

"Certain barium chemicals, notably the nitrate and carbonate, are used in making green flares, tracers, incendiary bombs, shell primers, etc., and for case-hardening of steel. Blanc fixe, or precipitated barium sulphate, is used in white paints, rubber, linoleum, and oilcloth. Barium carbonate is the principal intermediate salt used in the manufacture of other barium chemicals, particularly the peroxide and nitrate. It is also used to inhibit scumming in bricks and other heavy clay products. Barium chloride, obtained by crystallization from a solution of barium sulphide and calcium chloride, is used to purify salt brines for the manufacture of chlorine and sodium hydroxide; in coatings for photographic paper; as an extender in titanium pigments; in colour lakes; in finishing white leather, and in the purification of beet sugar. Barium hydroxide is used in the purification of beet sugar, and in refining animal and vegetable oils. Barium metal has only limited industrial uses.

"Barite is a relatively low-priced commodity. Canadian quotations for good white crude range from \$7 to \$10 per ton, f.o.b. mines, freight costs governing the price offered. Domestic ground barite sold in 1943 for \$40 per ton, f.o.b. works, and prime white imported for \$50.

"In the American market, crude barite is usually sold on a penalty-premium basis, with a content of 95 per cent barium sulphate and 1 per cent iron oxide considered as standard. A premium or penalty of 25 cents per short ton is set for each per cent of barium sulphate above or below 95 per cent, and a similar premium or penalty for each 0.1 per cent of iron oxide below or above 1 per cent. Average prices for standard crude in the American market have been showing an upward tendency in recent years, and in 1942 stood at \$7.25 per ton, f.o.b. mines, with the average overall figure for all grades \$6.22. Early in 1943, the Office of Price Administration authorized price increases for crude from mines in the Georgia-Tennessee field, with a ceiling at \$8.50 per ton for 1943 contracts. Total United States consumption of barite in 1942 was 450,000 short tons."

Table 276.—Production of Barite in Canada, 1929-1943

Year	Short tons	\$	Year	Short tons	\$
1929.....	105	2,341	1939.....	323	3,639
1930.....	66	1,484	1940.....	338	4,819
1931.....	16	363	1941.....	6,890	74,416
1932.....			1942.....	19,667	188,144
1933.....	20	60	1943.....	24,474	279,253

Table 277.—Barite and Blanc Fixe Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1934-1943

Year	Barite		Blanc Fixe (*)	
	Pounds	\$	Pounds	\$
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223
1936.....	2,533,275	41,687	97,016	3,148
1937.....	2,630,366	42,821	125,743	4,136
1938.....	2,729,212	46,288	116,545	3,287
1939.....	2,884,985	49,659	139,408	4,455
1940.....	3,281,747	71,492	90,422	3,873
1941.....	4,906,829	112,760	169,533	8,010
1942.....	6,833,584	150,927	104,948	5,328
1943.....	5,619,352	121,727	87,369	4,441

(*) Artificial barium sulphate.

Table 278.—Imports and Exports of Barite and Specified Commodities, 1942 and 1943

	1942		1943	
	Pounds	\$	Pounds	\$
IMPORTS—				
Blanc fixe.....	620,498	24,224	345,536	16,694
Lithopone.....	19,996,324	948,244	17,754,879	857,507
Barite.....	5,072,300	68,196	3,372,500	43,239
EXPORTS—				
Barite.....	Data not shown separately in Trade Reports			

CORUNDUM

Corundum is found in an area embracing several townships in Renfrew and Hastings counties in the province of Ontario. Corundum mining as an industry made its appearance there in 1900 and production reached a maximum in 1906. Shipments of the mineral in Canada during the period 1900-1921 totalled 19,524 short tons valued at \$2,104,251. No commercial shipments have been reported since 1921. No imports of corundum into Canada were shown in Customs reports for either 1942 or 1943. Imports of emery, in bulk, during 1943 were appraised at \$78,303; imports of manufactures of emery, n.o.p., in the same period were valued at \$81,984. It is interesting to note that a shipment of corundum-bearing material was made in 1943 from old mine dumps located in the Renfrew-Hastings district of Ontario; this was exported to the United States for experimental purposes.

Work has been proceeding in the Bureau of Mines, Ottawa, on the removal of the small content of corundum present in some sections of the Blue Mountain nepheline syenite deposit, located near Lakefield, Ontario, and it was found that a combination of jigging and flotation at 28-mesh was effective in reducing the corundum content to 0.134 per cent. A treatment unit, employing this method, which would provide also for the recovery of a corundum by-product, was placed in semi-commercial operation at the Rochester mill of American Nepheline Corporation during 1943.

The fine dust product resulting from the processing of Lakefield syenite has been found of service as a substitute for pumice for grinding and polishing and in the cleanser, enamelware, and heavy clay industries.

South Africa is the world's largest corundum producer and imports from that country into the United States have increased rapidly during the last few years. The material is crushed and sized, and the coarse grain products are sold to manufacturers of grinding wheels, especially snagging wheels, and the finer products to optical lens grinders.

"E & M J Metal Markets", New York, quoted corundum August, 1944—natural, per pound, size 8 to 60 inclusive, 8½ cents; 70 to 275, 9½ cents; 500, 30 cents; 850, 45 cents; 1,000, 45 cents; 1,200 to 1,600, 65 cents; 2,600, 70 cents.

DIAMONDS

Diamonds are not produced in Canada and requirements for stones in the Dominion are supplied entirely by imports. In 1943 imports of black diamonds for borers were appraised at \$1,631,019 compared with \$1,382,935 in 1942. Imports of unset white diamonds in 1943 were valued at \$1,407,044 as against \$957,348 in the preceding year. The "Mining Journal", London, in a review on South Africa for 1943 stated: The favourable market conditions which the diamond trade experienced in 1942 showed a considerable expansion in 1943. The total sales made by the Diamond Trading Company in 1943 were approximately £20,000,000, which constitutes a record in the history of the industry. As in 1942, the Diamond Trading Company and its associates continued to give their fullest support to the war industry, sales of industrial diamonds being somewhat in excess of £5,000,000, all of which were made at pre-war prices. In addition, the various companies operating outside the Union, which are the principal producers of industrial diamonds, have, in association with the Diamond Corporation and the Diamond Trading Company, transferred a substantial quantity of industrial diamonds to Canada, where they will be retained as a reserve stock against any emergency during the continuation of hostilities. These producers continued during 1943 to supply the allied powers with their needs of industrial diamonds.

DIATOMITE

Canadian production of diatomite during 1943 totalled 98 short tons valued at \$3,331 compared with 365 tons worth \$9,088 in 1942. The 1943 output comprised 82 tons produced in Nova Scotia and 16 tons in British Columbia.

"Diatomite consists of the microscopically small remains of siliceous shells of diatoms, a form of algae that at one time lived under water. The material of recent fresh water origin, which is the most common in Canada, usually occurs as a grey or brown mud or peat, whereas the Tertiary diatomite is in more or less dry and compact beds, very light in weight and white to cream in colour.

"For many years International Diatomite Limited, Tatamagouche, Nova Scotia, has been the principal producer, but operations in the ponds near New Annan ceased in the fall of 1940. The two producers during the past 3 years were G. Wightman, from a deposit on Digby Neck, Nova Scotia; and R. L. Marsh for L. T. Fairey of Vancouver, from lot 1122 on the west bank of Fraser River, north of Quesnel in the Cariboo district, British Columbia.

"Northern Diatomite Company of Toronto started the erection of a treatment plant on its deposit south of Gravenhurst in the Muskoka district in the fall of 1942, but it was not completed. Some prospecting was done on deposits in Quebec and in British Columbia.

"In 1943 slightly more than 70 per cent of the diatomite consumed in Canada was used in the form of filter-aids, mainly in the refining of cane sugar. Eleven per cent was used for insulation, including a small amount for the slow cooling and tempering of steel parts; and the remainder was used principally as a filler in the paint, chemical, paper, rubber, soap, and textile industries, and to a small extent in silver polish bases and as an admixture in concrete. In the United States diatomite is used for blocks and pipe insulation in combination with asbestos in the naval construction program; in light weight fireproof structural sheets for minimizing fire hazards on warships; and as an extender for painting army equipment to cut down lustre.

"The price of Canadian diatomite for insulation varies from \$25 to \$40 and of imported diatomite for insulation and filtration from \$26 to \$75 per ton; for material suitable for polishes the price for small lots ranges up to \$200 a ton. Imported insulation bricks vary in price from \$85 to \$140 per 1,000, according to grade and density."—(Bureau of Mines, Ottawa).

Table 279.—Production of Diatomite in Canada, 1928-1943

Year	Short tons	\$	Year	Short tons	\$
1928.....	368	8,960	1936.....	615	13,650
1929.....	429	10,330	1937.....	643	18,006
1930.....	554	13,247	1938.....	398	13,842
1931.....	1,610	32,789	1939.....	301	10,388
1932.....	1,496	29,509	1940.....	248	7,957
1933.....	1,789	36,648	1941.....	344	9,935
1934.....	1,372	54,910	1942.....	365	9,088
1935.....	823	33,140	1943.....	98	3,331

Table 280.—Consumption of Infusorial Earth by the Canadian Sugar Refining Industry, 1932-1943

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1932.....	2,577,585	73,309	1938.....	4,908,597	101,473
1933.....	2,507,469	70,191	1939.....	4,819,811	105,711
1934.....	2,562,552	69,116	1940.....	4,984,362	112,360
1935.....	4,307,142	98,560	1941.....	5,343,131	138,973
1936.....	4,375,999	98,954	1942.....	3,007,180	75,295
1937.....	4,586,786	95,532	1943.....	3,451,142	89,075

Imports into Canada of diatomaceous earth or infusorial earth, ground or unground, during 1943 totalled 11,246,800 pounds valued at \$184,010 compared with 8,588,500 pounds worth \$155,802 in 1942.

FLUORSPAR

Canadian mine shipments of fluorspar in 1943 totalled 11,210 short tons valued at \$318,424 compared with 6,199 tons worth \$146,039 in 1942; of the 1943 output, 825 tons originated in Nova Scotia and 10,385 tons in Ontario.

Fluorspar is not widely distributed in Canada, and commercial deposits are restricted to a few local areas which have supplied practically all of the comparatively small production, totalling about 75,000 tons to the end of 1943. Chief centre of production has been the Madoc area, Hastings county, Ontario. In 1943 seven producers reported shipments from the Madoc district. No beneficiation, other than cobbing and picking, is practised on Madoc ores and shipments consist of screened fines sweetened with clean picked lump. Most of the activity in the Madoc field in 1943 resulted from financial assistance given by the Dominion Government in an effort to stimulate production. Interest also developed during the year in the commercial possibilities of fluorspar occurrences in the Harcourt-Wilberforce area, Haliburton county about 50 miles north of Madoc. The only other fluorspar mined in 1943 came from the old MacKay property at Lake Ainslie, Cape Breton, Nova Scotia. In British Columbia an important deposit of fluorspar exists at the Rock Candy mine, near Grand Forks.

World production of fluorspar prior to the war averaged about 500,000 short tons annually, the United States and Germany supplying about 75 per cent of the total. The remainder came mainly from Russia, the United Kingdom, Newfoundland, France, Korea, Italy and the Union of South Africa.

Around 55 per cent of fluorspar shipments in the United States in 1943 went to the steel industry and 29 per cent to manufacturers of hydrofluoric acid. The remainder was used for ceramic purposes, chiefly in the glass industry.

"By arrangement with consumers, the price of domestic metallurgical fluorspar was set in 1942 by the Metals Controller on the following basis: \$24 in U.S. funds, per short ton, f.o.b. Kentucky-Illinois mines, plus 11 per cent exchange, plus 10 per cent war exchange tax, plus freight from above field to Canadian consuming point, less freight from Canadian mine to same point, less 25 cents for each per cent CaF_2 below 85 per cent. As an example, this would work out at \$36.36 per short ton for standard 85 per cent grade, f.o.b. Madoc, for shipment to Sault Ste. Marie, Ontario, or \$32.38 for shipment to Hamilton, Ontario. Although revised maximum prices went into effect in the Illinois-Kentucky field in July, 1943, there was no change in the above agreement as a result of the increases. The revised prices were in the nature of premiums offered in an effort to increase production and were as follows:

70 effective units and over \$33 per ton			
65 to 70	"	"	\$32 "
60 to 65	"	"	\$31 "
Under 60	"	"	\$30 "

"Glass and enamel grades call for not less than 95 per cent CaF_2 , with a maximum of $2\frac{1}{2}$ to 3 per cent silica and 0.12 per cent iron (Fe_2O_3). The material must be in ground form, in mesh sizes ranging from coarse to extra fine.

"Acid-grade spar has the most rigid specification, namely, a minimum of 98 per cent CaF_2 and not over 1 per cent silica. Like the ceramic grade, it must be in powder form, and most of the material supplied to both the acid and ceramic trades is a flotation concentrate. In July, 1943, the United States price for both acid and ceramic spar was raised to \$37 per short ton, f.o.b. mines, an increase of \$2 to \$3 over the 1942 levels. There has been little or no production of these grades in Canada, so that no price has been set for them.

"It is estimated that 95 per cent of all fluorspar now being used in the United States and Canada is consumed in war industries."—(Bureau of Mines, Ottawa).

Table 281.—Production of Fluorspar in Canada, 1924-1943

Year	Short tons	\$	Year	Short tons	\$
1924.....	76	1,343	1935.....	75	900
1925.....	3,886	19,234	1936.....	75	900
1926-1928.....			1937.....	150	2,550
1929.....	17,870	268,120	1938.....	217	3,906
1930.....	80	1,240	1939.....	240	4,995
1931.....	40	620	1940.....	4,454	59,317
1932.....	32	464	1941.....	5,534	97,767
1933.....	73	1,064	1942.....	6,199	146,039
1934.....	150	2,100	1943.....	11,210	318,424

Table 282.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry, 1942 and 1943

	1942		1943	
	Quantity	Cost at works	Quantity	Cost at works
	tons	\$	tons	\$
Steel furnaces.....	20,133	562,480	20,790	715,991
Chemicals (acids, alkalis and salts).....	21,689	684,194	41,409	1,320,106
Glass.....	231	10,273	273	13,360
Ferro-alloys.....	853	21,203	1,407	37,802
Enamelling and glazing.....	103	4,120	74	2,960
Total accounted for.....	43,069	1,282,270	63,953	2,090,219

NOTE:—Considerable fluorspar is also consumed in the manufacture of aluminum.

Table 283.—Imports of Fluorspar Into Canada, 1929-1943

Year	Tons	\$	Year	Tons	\$
1929.....	12,092	159,798	1937.....	11,444	158,082
1930.....	12,651	160,995	1938.....	15,057	212,131
1931.....	3,216	31,257	1939.....	16,322	258,796
1932.....	1,069	22,965	1940.....	30,312	628,719
1933.....	2,219	21,165	1941.....	26,539	567,656
1934.....	7,220	56,628	1942.....	47,784	1,046,526
1935.....	11,591	92,775	1943.....	77,436	1,738,669
1936.....	11,194	95,268			

GARNET

There were no commercial mine shipments of garnet in Canada during 1943. In 1942 some 17 tons of crude garnet rock valued at \$176 were shipped to the United States for experimental purposes; the mineral was obtained from a deposit located in Dana township near River Valley, about fifty miles northwest of North Bay, Ontario.

Commercial garnet belongs to a group of complex silicate minerals of which almandite, the brownish-red iron-aluminum silicate is generally considered the hardest and best as an abrasive. Garnet is a rather common mineral constituent of certain rocks distributed throughout the Dominion and it usually occurs as a garnetiferous-gneiss, large areas of which are known in parts of Ontario and Quebec. Garnet, crushed and suitably graded as to size, is used for making abrasive-coated papers and cloth. The specifications for garnet for use in the making of high-quality abrasives are somewhat exacting. The individual crystals should be clear and free from embedded impurities and from minute fractures. They should be of a deep wine-red colour and not smaller than pea size, walnut size or larger being preferable. The deposit should be extensive and the garnet content not less than 25 per cent. It should also be close to rail transportation and industrial centres. About 80 per cent of the world output of garnet comes from the United States. Canadian consumption of prepared garnet grain suitable for "sand paper" manufacture has decreased and is now less than 200 tons annually.

The price in the United States of the best-quality concentrate from which grain is prepared for abrasive papers and cloths ranges from \$65 to \$80 a ton f.o.b. mines and of graded grain, \$90 a ton. Canadian prices of crushed garnet rock for sand-blasting were \$7 to \$10 a ton in 1942, but none was sold in 1943.

Crude garnet ore or ungraded mixed concentrate enters the United States duty free, the duty on grain graded into separate sizes and specially prepared garnet being one cent a pound.

GRAPHITE

Production of graphite in Canada in 1943 continued to be confined to the old-established Black Donald mine at Whitefish Lake, near Calabogie, Renfrew county, Ontario, which now has a record of 35 years of operation. The output during the year under review totalled 1,903 tons valued at \$197,431 compared with 1,192 tons worth \$117,904 in 1942. The following information is from a report "Graphite in 1943" as prepared by the Bureau of Mines, Ottawa:

"Flake graphite is widely distributed in the Archaean gneisses and crystalline limestones of western Quebec and eastern Ontario, and this region formerly supported a somewhat extensive graphite industry; but growing dependence on Madagascar as a source of supply, more especially of high-grade crucible flake, led to a gradual closing down of operations, and all of the plants except that of the Black Donald Company were dismantled many years ago.

"In 1942, owing to the possibility of supplies from Madagascar being cut off, renewed investigation of deposits in Canada was encouraged and surface stripping was done by established mining companies on some of the discoveries that were made, with a view to possible development. Various properties, including old idle mines, were examined by the Bureau of Mines and the Metals Controller, Ottawa, in company with representatives of the United States War Production Board, and several sample shipments were tested by the Bureau of Mines. The threatened emergency was averted by the British occupation of Madagascar, and it was not found necessary to take further steps to encourage interest in the development of a Canadian supply. Ore reserves at many of the old properties are believed to be considerable, and could probably be used in an emergency, though this would entail the erection of new mills, or possibly of a central custom mill, to treat the ore.

"World production of natural graphite of all grades and including flake, crystalline (plumbago) and amorphous, averaged about 140,000 short tons a year prior to the present war. Madagascar, Germany, Austria and Czechoslovakia were the principal producers of flake graphite; Ceylon of Crystalline; and Mexico and Korea of the amorphous variety. The United States obtains most of its requirements of graphite from Madagascar and Ceylon, but there was a production of flake in 1943 from Alabama, Texas, and Montana; of low-grade amorphous graphite from Nevada and Michigan; and of anthracite-graphite (so-called "sea-coal") from Rhode Island.

"Graphite has many uses in industry, but is employed principally in foundry facings, lubricants, crucibles, retorts and stoppers, packings, pencils and crayons, paints, and stove polish. Dry batteries, electrodes, and commutator brushes use important quantities, mostly amorphous or artificial.

"Canadian graphite requirements are principally for the foundry, dry battery, packings, lubricants, and paint trades. Foundry needs are met in part by domestic (Black Donald) production, and in part by imported Ceylon plumbago. The battery trade uses mainly Mexican amorphous; and paint requirements are filled largely by low-grade amorphous and flake.

"Prices showed little change in 1943 from those of the previous year. Average quotations in the American market were as shown below. Ceylon graphite, which is marketed in a considerable range of types and qualities, sold as follows: crude lump, 97 per cent carbon, 15 cents per pound; high carbon lump, 85 to 98 per cent, 10 to 13 cents; chip, 85 to 90 per cent, 11 to 12½ cents; crystalline dust, 65 to 80 per cent, 6½ to 9 cents; flying dust, 55 to 80 per cent, 4½ to 8 cents; carbon dust, 55 to 60 per cent, 4 to 5 cents. Madagascar crucible flake, 85 per cent carbon and up, was nominal, under allocation control, at 10 to 11 cents. Domestic lubricating flake, 90 per cent plus, sold at 15 to 20 cents, and domestic fine flake, 65 to 70 per cent, for use in the manufacture of foundry facings, at 4½ cents. Metals Reserve Company prices, per pound, for domestic flake, were as follows: No. 1A, 14 cents; No. 1, 13 cents; No. 1B, 12 cents; No. 2, 11 cents; No. 3, 7 cents; No. 4, 5 cents. Mexican amorphous, 80 to 90 per cent carbon, crude lump, sold for \$20 per ton, f.o.b. Sonora, and powdered, for 4 to 6 cents per pound.

"At the beginning of the year, all graphite was placed in Group 1 (supply insufficient for war and essential industrial needs) of the list of materials in critical supply issued by the Conservation Division of the United States War Production Board.

"Canadian exports of milled products in 1943 were valued at \$42,987, compared with \$58,572 in 1942. Imports of unmanufactured graphite were valued at \$23,773; of manufactured, at \$286,583; and of graphite crucibles at \$191,296. Exports of Canadian graphite and graphite products have been subject to special export licence, since January, 1941."

Table 284.—Mine Production (Sales) of Graphite in Canada, 1931-1943

Year	Short tons	\$	Year	Short tons	\$
1931.....	548	32,149	1938.....	(*)	41,590
1932.....	346	18,483	1939.....	(*)	61,684
1933.....	405	18,367	1940.....	(*)	94,033
1934.....	1,518	71,424	1941.....	(*)	132,024
1935.....	1,782	79,781	1942.....	1,192	117,904
1936.....	(*)	88,812	1943.....	1,903	197,431
1937.....	(*)	125,343			

(*) Not available for publication.

Table 285.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1942 and 1943

Industry	1942		1943	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Paints and varnishes.....	103	11,855	94	9,837
Polishes.....	39	5,020	57	6,525
Foundries.....	410	59,874	606	72,150
Acids and salts.....	114	34,582	167	45,654
Prepared foundry facings.....	316	19,108	202	19,739
Total accounted for.....	982	130,439	1,126	153,953

GRINDSTONES AND PULPSTONES

Production of grindstones and sharpening stones in Canada during 1943 totalled 164 short tons valued at \$6,225 compared with 216 tons worth \$10,000 in 1942. Comprising the 1943 output were 2 tons of sharpening stones valued at \$225 and 162 tons of grindstones worth \$6,000. There was no production of pulpstones in 1943. The production of both grindstones and sharpening stones during the year under review came entirely from the quarries of the Read Stone Company, located near Stonehaven, New Brunswick.

Material suitable for these stones occurs in certain sandstone beds in Nova Scotia, New Brunswick, and on the coast of British Columbia. Many years ago the output was considerable, but most of the known beds have been depleted and the demand for natural stones has decreased.

The large-size Canadian grindstones are used mainly for sharpening pulp-mill and tobacco knives; and in the United States in the file, machine-knife, granite tool, and sheer manufacturing industries. The small stones are used for grinding scythes and axes. Because of the competition from the artificial grinding wheel and from foreign natural stones, production of grindstones from quarries continues to decline.

Good pulpstones are in demand, particularly for use in the large magazine grinders, but known Canadian deposits containing thick beds of sandstone of the proper quality appear to have been worked out and production has ceased. There is also an increasing competition from Canadian-made artificial segmental pulpstones, mainly of silicon carbide grit, and about 620 of these stones are in use and in stock in the various Canadian pulp mills. The imported natural pulpstones come mainly from West Virginia.

Canadian trade reports show the following imports in 1943: grinding wheels, \$493,247; grinding stones, \$115,561; grindstones, 36 inches or over, \$64,731 and grindstones n.o.p. \$2,266.

Table 286.—Production of Grindstones, Pulpstones and Scythestones in Canada, 1931-1943

Year	Tons	\$	Year	Tons	\$
1931.....	621	38,103	1938.....	306	16,198
1932.....	328	15,735	1939.....	304	15,278
1933.....	498	21,919	1940.....	341	14,543
1934.....	987	46,478	1941.....	188	11,500
1935.....	708	34,010	1942.....	216	10,000
1936.....	569	24,724	1943.....	164	6,225
1937.....	412	21,429			

Table 287.—Production of Natural Abrasive Stones, by Kinds, 1943

	Pulpstones		Sharpening Stones		Grindstones	
	Tons	\$	Tons	\$	Tons	\$
Nova Scotia.....						
New Brunswick.....			2	225	162	6,000
Canada.....			2	225	162	6,000

Table 288.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1934-1943

Year	Number for 2 ft. wood	Value	Number for 2-5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,805
1936.....	463	120,227	61	19,478	253	281,265
1937.....	392	123,598	84	21,700	280	382,084
1938.....	306	92,822	37	13,351	186	238,488
1939.....	242	60,622	60	22,443	203	238,620
1940.....	311	96,957	110	49,899	163	257,628
1941.....	295	127,349	77	35,843	97	215,913
1942.....	237	100,466	53	23,898	94	208,986
1943.....	197	102,888	54	20,000	66	151,411

THE ARTIFICIAL ABRASIVES INDUSTRY

The factory selling value of all products made during 1943 by the manufacturers in Canada of artificial abrasives and artificial abrasive products amounted to \$36,609,928. This value represented a gain of 16 per cent over the total of \$31,516,161 for 1942.

There were 15 firms engaged in manufacturing artificial abrasives and their products during the year, and of these, 13 were located in Ontario and 2 in Quebec.

The average number of employees in the industry was 3,336 and payments in salaries and wages totalled \$6,453,769. Expenditures for manufacturing materials amounted to \$11,581,923, and \$2,988,814 was paid out for fuel and electricity. Capital investment in the industry totalled \$13,172,836, of which \$5,208,394 was the value placed on land, buildings and equipment.

Artificial abrasives were made by 4 plants in Ontario and 2 in Quebec. The output of these 6 works was valued at \$31,275,860 and included 190,727 tons of crude fused alumina at \$20,543,657; 51,281 tons of crude silicon carbide at \$6,846,087, and other products and by-products, such as, ferrosilicon, firesand, refractory brick, refractory cements, calcium boride, boron carbide and abrasive wheels. An average of 2,773 people were employed and salaries and wages totalled \$5,318,749.

Nine other plants were occupied chiefly in making abrasive products, such as, wheels, paper, pulpstones and sharpening stones; 7 made abrasive wheels and segments, 4 made sharpening stones and files, and 3 made abrasive cloth and paper. The value of all products made in these establishments was \$3,589,579. The number of employees was 563 and payments for salaries and wages amounted to \$1,135,020.

Table 289.—Materials Used in Manufacturing, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Bauxite and pure alumina.....	ton	197,377	5,427,524	227,662	5,902,898
Coal (not for fuel)—					
For fused alumina.....	ton	662	4,243	245	1,614
For silicon carbide.....	ton	7,379	60,434	8,019	60,343
Coke (not for fuel)—					
For fused alumina.....	ton	11,959	75,950	14,443	89,545
For silicon carbide.....	ton	48,024	664,699	58,146	904,557
Electrodes.....	ton	3,617	437,663	4,279	520,236
Feldspar.....	ton	119	6,113	117	5,776
Iron borings.....	ton	20,830	261,304	20,889	283,311
Salt.....	ton	392	4,172	410	4,793
Sawdust.....	ton	10,820	36,243	12,766	44,223
Silica sand.....	ton	76,943	416,806	89,022	511,649
Artificial abrasive grains—					
Fused alumina.....	ton	5,106	904,578	4,106	826,967
Silicon carbide.....	ton	1,849	318,198	1,543	298,675
Natural abrasive grains—					
Garnet.....	lb.	350,314	33,982	343,929	29,768
Emery.....	lb.	321,853	22,614	308,548	19,982
Quartz or flint.....	lb.	459,991	7,640	349,340	5,410
Other.....	lb.	72,575	7,415	76,545	6,608
Bonding and bushing materials—					
Clay bonds.....	lb.	988,632	38,869	1,152,171	55,907
Silicate (quantity in equivalent solid form).....	lb.	15,930	881		2,799
Elastic mixture.....	lb.	48,528	12,729	12,291	3,221
Bakelite and synthetic resins.....	lb.	409,614	140,954	365,704	123,057
Lead for bushings.....	lb.	111,130	5,870	107,341	5,978
Cotton cloth.....			87,310		340,709
Kraft paper.....			23,250		21,425
Containers and packing material.....			102,788		114,823
All other materials.....			1,133,450		1,398,649
Total.....			10,245,679		11,581,923

Table 290.—Products Manufactured, 1942 and 1943

Product	1942		1943	
	Short tons	Selling value at works	Short tons	Selling value at works
		\$		\$
Crude silicon carbide.....	44,410	5,494,257	51,291	6,846,087
Crude fused alumina.....	160,935	17,750,623	190,727	20,543,657
Silicon carbide firesand, etc.....	268	17,062	229	14,336
Abrasive wheels and segments.....		5,075,258		5,114,962
Sharpening stones and files.....		251,320		303,913
Ferrosilicon.....	12,875	187,664	15,860	240,430
Other products (*).....		2,739,977		3,546,543
Total.....		31,516,161		36,609,928

(*) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by one or two companies.

KYANITE

Kyanite is usually a rock-forming mineral, and only rarely does it occur in large monomineralic masses as segregations in quartz-kyanite gneiss or schist. Indian kyanite is the most popular at the present time; the production in India commenced in 1924 and amounted to 24,787 tons in 1936. The mineral also occurs in Nyasaland, British East Africa and Western Australia.

The leading andalusite mine in the world is operated by Champion Sillimanite, Inc., in the White Mountains, California; this company is a subsidiary of the Champion Spark Plug Co., Detroit, Mich.

None of the minerals, kyanite, sillimanite or andalusite are commercially mined in Canada at the present time and any imports of these minerals into Canada are not shown separately in the Canadian Customs classification. "Metal and Mineral Markets", New York, October, 1944, quoted kyanite—per ton f.o.b. point of shipment, crude, \$19; 35 mesh, \$37.50; glass grade \$40 nominal.

LITHIUM MINERALS

Commercial mine shipments of Canadian lithium minerals were only recorded in 1937. These were made by the Lithium Corporation of Canada, Limited, from deposits located at Bernie Lake, near Pointe de Bois, Eastern Manitoba. For further details refer to chapter 5.

MAGNESITIC DOLOMITE AND BRUCITE

Canadian production of magnesitic dolomite, including brucite granules totalled \$1,260,056 in 1943 compared with \$1,059,374 in 1942. The following information has been supplied by the Bureau of Mines, Ottawa:

"Magnesitic dolomite consisting of an intimate mixture of magnesite and dolomite is quarried at Kilmar and at Harrington East, Argenteuil county, Quebec, and is processed for use as refractory materials. Products at present marketed include caustic calcined magnesitic dolomite, dead-burned or grain materials, bricks and shapes (both burned and unburned), finely ground refractory cements, and, in combination with chrome, the dead-burned material is used as an ingredient in certain other types of refractory. Magnesia products made in Canada from imported magnesite and magnesia include fused magnesia (artificial periclase), optical periclase, and '85 per cent magnesia' pipe covering.

"Large deposits of magnesite containing considerable silica and alumina occur in British Columbia near Marysville, between Cranbrook and Kimberley. They are owned by Consolidated Mining and Smelting Company of Canada, Limited, and experimental work to remove the silica and alumina by flotation has been done, but there has been no commercial production to date. A number of other deposits of magnesite are known in British Columbia and Yukon, but either because of their limited extent or remoteness from transportation they are not of commercial importance at present.

"Deposits of earthy hydromagnesite occur in British Columbia near Atlin and Clinton, and at various times some have been worked on a small scale, but there has been no production in recent years.

"Brucite (magnesium hydroxide) in the form of granules thickly disseminated through a matrix of crystalline limestone occurs in large deposits at Rutherglen, Ontario, and at Bryson and Wakefield in the province of Quebec. By a process developed in the Bureau of Mines laboratories, Ottawa, it is possible to recover these brucite granules in the form of magnesia of a high degree of purity and to have hydrated lime as a co-product. A plant using this process is now in operation near Wakefield, Quebec. The granular magnesia produced is at present used mostly for making basic refractories, and for making a special grade of paper.

"Magnesite is available in many countries; Russia is probably the world's greatest producer of magnesite, but almost all is for domestic use.

"Magnesite is usually calcined before shipment and the resultant magnesia is used for the making of refractory products to withstand extremely high temperatures, for making oxychloride cement, and for magnesium metal. It is also the basis of a number of magnesium salts and has many minor uses. The worldwide demand for magnesium metal has greatly stimulated interest in deposits of magnesite. Although until 3 years ago almost all the world's magnesium was made from magnesium chloride brine and from waste water used in treating potash minerals, magnesite is now an important source of this light metal in continental Europe, England, and the United States.

"Brucite is much less common than magnesite. The only deposits being worked commercially are in Canada and the United States. The magnesia obtained by calcining brucite may be used for the same purposes as that obtained from magnesite and also has some special applications of its own."

Table 291.—Production of Magnesitic Dolomite (Calcined) in Canada, 1930-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1930.....	13,336	336,162	1937.....	(a)	677,207
1931.....	11,411	295,579	1938.....	(a)	(t) 420,261
1932.....	(a)	262,860	1939.....	(a)	474,418
1933.....	(a)	360,128	1940.....	(a)	897,016
1934.....	(a)	382,927	1941.....	(a)	831,041
1935.....	(a)	486,084	1942.....	(a)	(b) 1,059,374
1936.....	(a)	768,742	1943.....	(a)	1,260,056

(t) Represents value of magnesite (dead-burned, etc.) only, whereas the values for years immediately preceding include the value of some end products containing imported material; for this reason the 1938 to 1943 values are not entirely comparable with those for preceding years.

(a) Not available for publication.

(b) 1942 and following years include the value of brucite shipped.

Table 292.—Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1931-1943

Year	Calcined Dolomite (b)		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
1931.....			15,773	76,317	(a)	(a)
1932.....			6,725	32,523	420	14,500
1933.....			6,874	30,557	399	14,798
1934.....			14,748	69,104	2,733	105,072
1935.....			18,394	79,914	3,891	149,987
1936.....			43,562	145,502	6,432	230,656
1937.....			53,066	181,146	8,994	326,091
1938.....			40,540	137,127	9,219	336,811
1939.....	14,858	99,838	40,592	78,904	11,401	351,680
1940.....	21,949	136,360	59,284	123,429	13,673	506,032
1941.....	21,608	160,602	71,087	159,037	18,127	682,742
1942.....	22,550	179,427	79,091	225,393	20,665	786,321
1943.....	10,310	99,740	78,746	243,793	24,494	1,067,962

(a) Information not available.

(b) Included with crude dolomite prior to 1939.

Relatively large quantities of magnesite or magnesium refractories are also used in the smelting of non-ferrous ores but complete data relating to this consumption are not yet available.

Table 293.—Calcined Magnesite Used by the Artificial Abrasive and Abrasive Products Industry in Canada, 1934-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	104	6,370	1939.....	121	7,735
1935.....	40	2,448	1940.....	302	19,331
1936.....	418	25,256	1941.....	809	77,508
1937.....	484	29,242	1942.....	398	58,648
1938.....			1943.....	150	12,164

Prices of calcined magnesite in 1943 f.o.b. Montreal or Toronto, as quoted by Canadian Chemistry and Process Industries, were \$70 to \$90 a ton. This price has continued since November, 1939 when the price rose from the \$48 to \$60 range that had prevailed for more than a year previously.

Trade reports show the following imports into Canada during 1943: magnesite firebrick, \$1,111,754; crude magnesite rock, 82,000 pounds valued at \$1,583; dead-burned magnesite, 15,897,200 pounds valued at \$365,080; magnesite for insulating material, 1,237,100 pounds at \$40,536; magnesia pipe covering, \$249,634; magnesium carbonate for rubber, 860,007 pounds, \$47,068; magnesium oxide, 1,900,513 pounds, \$180,039.

Exports from Canada during 1943 included 792 tons calcined magnesite valued at \$16,398 and 8,610 tons of dead-burned refractories worth \$94,578.

MAGNESIUM SULPHATE (EPSOM SALTS)—NATURAL

There were no commercial mine shipments of natural magnesium sulphate in 1943; in 1942 production totalled 1,140 short tons valued at \$38,760, the mineral being obtained in that year from deposits located about 14 miles from Ashcroft in British Columbia.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"Natural hydrous magnesium sulphate (Epsom Salts or Epsomite) occurs in deposits in lake bottoms or in solution in brine lakes in British Columbia. In Saskatchewan, it is found associated with sodium sulphate. Attempts have been made to produce refined salts, and a number of years ago there was a considerable production from several of the "lakes" in British Columbia, and experimental shipments have been made from one of the lakes in Saskatchewan.

"Canada's output of magnesium sulphate has come chiefly from a deposit in Basque, British Columbia, production from which was discontinued in the autumn of 1942. The salt was refined at Ashcroft, 15 miles south of the deposit and the grade of the product was high. The refinery, owned by Ashcroft Salts Company, Limited, was dismantled in 1943. There are a number of other occurrences in British Columbia, near Clinton, north of Kamloops, and in Kruger's Pass, south of Penticton.

"In Saskatchewan, to lakes south of Wiseton contain brines high in magnesium sulphate, and Muskiki Lake, just north of Dana, contains brine high in magnesium and sodium sulphate, which at certain times of the year, crystallizes into a bedded deposit with layers of both salts.

"In the chemical industries, Epsom salt has many uses. It is employed for tanning and in dyeing, and for the textile and medicinal use. Magnesium sulphate is used in the paper industry for weighting paper. In the sole leather industry it is used to obtain a clean shiny cut, and it also helps to retain moisture in the leather and increases its weight. Magnesium salt is used to a small extent in the dyeing industry. In some cases it is used in the after treatment

of leather to increase the fastness of the colour in washing. It is used extensively and in large quantities in medicine and for various purposes in the manufacture of textiles. In bleaching wool, magnesium sulphate is added to destroy the corrosive effect of sodium peroxide. It is also used for weighting textile fabric, especially silk. Mixed with gypsum and ammonium sulphate it is used in the manufacture of non-inflammable fabrics.

"Prices for Epsom salts remained steady, due to the discontinuance of supplies from European countries, hitherto the main sources of supply. Quotations for the technical grade, as given by Canadian Chemistry and Process Industries for Toronto or Montreal delivery, ranged from \$63.00 to \$65.00 per short ton in bags, whereas the B.P. material was quoted at \$3.60 per barrel throughout the year."

Imports of magnesium sulphate or Epsom salts into Canada during 1943 totalled 6,757,551 pounds valued at \$137,372 compared with 3,376,767 pounds worth \$68,532 in 1942.

Table 294.—Production of Natural Magnesium Sulphate in Canada(x), 1935-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1935.....	340	7,965	1939.....	550	9,900
1936.....	654	13,712	1940.....		
1937.....	727	14,456	1941.....	265	7,343
1938.....	470	9,400	1942.....	1,140	38,760
			1943.....		

(*) Produced entirely in British Columbia.

Table 295.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and in Tanning, 1935-1943

Year	Pharmaceutical preparations		Tanning	
	Pounds	Value	Pounds	Value
		\$		\$
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	15,120
1937.....	919,825	23,881	992,203	16,165
1938.....	855,547	23,687	1,272,549	14,153
1939.....	830,927	24,091	1,139,670	17,808
1940.....	925,948	31,554	1,646,217	34,242
1941.....	1,043,110	35,389	1,508,824	43,400
1942.....	1,077,601	38,352	1,782,479	45,956
1943.....	1,154,065	41,031	1,870,046	52,447

MINERAL WATERS

Shipments of natural mineral waters from Canadian springs in 1943 totalled 139,611 gallons valued at \$67,541 compared with 157,085 gallons worth \$74,505 in 1942.

Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. Francois river in Yamaska county; Potton Springs in Brome county and the Colombia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot Springs in the Fraser Valley and the Halcyon Hot Springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion was 17 in 1943, of which 12 were located in the province of Quebec and 5 in Ontario.

Table 296.—Shipments of Natural Mineral Waters From Canadian Springs, 1931-1943

Year	Quebec		Ontario		Canada	
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
1931.....	19,868	4,746	197,540	8,578	217,408	13,324
1932.....	15,506	4,697	61,208	2,473	76,714	7,170
1933.....	9,024	3,094	29,794	2,347	38,818	5,441
1934.....	75,665	16,116	21,775	1,622	97,440	17,738
1935.....	126,616	15,113	19,900	1,477	146,516	16,590
1936.....	131,186	17,399	23,100	1,117	154,286	18,516
1937.....	198,319	19,697	26,700	889	225,019	20,586
1938.....	159,893	19,033	28,416	2,586	188,309	21,619
1939.....	104,629	17,503	19,140	1,602	123,769	19,105
1940.....	109,025	18,466	31,638	2,426	140,663	20,892
1941.....	144,441	58,062	36,623	14,469	181,064	72,531
1942.....	129,062	60,316	28,023	14,189	157,085	74,505
1943.....	125,605	61,793	14,006	5,748	139,611	67,541

Table 297.—Sales of Natural Mineral Waters (*) by the Canadian Aerated Waters Industry, 1930-1943

Year	\$	Year	\$
1930.....	178,348	1937.....	102,648
1931.....	140,730	1938.....	105,872
1932.....	92,066	1939.....	95,531
1933.....	77,125	1940.....	89,013
1934.....	52,113	1941.....	104,364
1935.....	45,100	1942.....	125,157
1936.....	63,687	1943.....	117,214

(*) Whether fortified or not.

PHOSPHATE

Shipments of apatite from Canadian mines in 1943 totalled 1,451 short tons valued at \$18,385 compared with 1,264 short tons worth \$17,431 in 1942; of the 1943 output, 1,050 tons worth \$14,272 came from properties located in the province of Quebec and 401 tons valued at \$4,113 from Ontario. The following information is from a report prepared by the Bureau of Mines, Ottawa:

"All of the phosphate produced in Canada consists of apatite, a common associate of phlogopite mica occurring in the Precambrian crystalline pyroxenites of adjacent sections of southwestern Quebec and eastern Ontario. Since about 1900, the mining of straight apatite has been on a limited scale and a large part of the mineral sold has been by-product material from mica mines. Since the commencement of the present war, there has been a slight revival of interest in the production of apatite and several of the larger old mines, mainly in Quebec, have produced small tonnages. The largest total annual output from these recent operations has been only 2,487 tons (in 1941), but this exceeded the production in any other year since 1900.

"For many years, Electric Reduction Company, Buckingham, Quebec, has purchased most of the apatite produced, for use in the production of elemental phosphorus and various phosphorus compounds. Canadian Refractories Ltd., Kilmar, Quebec, also are in the market for small tonnages.

"Sedimentary phosphate rock occurs in Canada in beds of Carboniferous and Permian-Jurassic age along the Rocky Mountains divide, notably in the Crowsnest area. The rock, however, is rather low-grade and is not considered to be of present economic interest. An attempt to develop the deposits in the Crowsfoot-Michel area was made about ten years ago by Consolidated Mining and Smelting Company, as a source of phosphate for its Trail fertilizer plant, but the project was abandoned in favour of higher-grade rock obtained from Garrison, Montana, Eastern Canadian plants using phosphate for fertilizer or other purposes employ mainly Florida rock.

"No form of beneficiation of Canadian apatite has ever been employed other than picking and cobbing, and the shipping product has consisted of picked crude lump, sometimes mixed with screened mine and cobbing fines. The average grade is comparatively low and often erratic, commonly ranging from about 60 to 70 per cent tricalcic phosphate. The usual impurities are calcite, iron sulphide, pyroxene, mica, and other silicate minerals.

"In this connection, it should be noted that although Canadian apatite reserves, doubtless, are substantial, the deposits tend to be erratic and pockety, and are incapable of supplying more than a small fraction of domestic requirements for phosphate, which amount to about 250,000 tons annually. Total production since the inception of mining in 1870 is estimated at about 350,000 tons.

"Phosphate is used chiefly for the manufacture of superphosphate fertilizers. It is used also in the manufacture of phosphoric acid and its derivatives; phosphorus; ferrophosphorus; in stock and poultry feeds; as fertilizer filler; as a calcined phosphate addition in pig iron blast furnaces; and for direct application to soils.

"Total world reserves of phosphate have been estimated to be in excess of 26 billion tons, of which about half is in the United States, one-third in Russia, and one-eighth in North Africa, with the remainder scattered over Oceania, South America, and Asia.

"Purchase price basis for Canadian apatite remained at \$16 per short ton for 80 per cent material, with a penalty or premium of 20 cents per unit below or above that figure. The average price of imported Florida phosphate, laid down, during 1943 was about \$17.50 per long ton for 73 per cent grade."

Phosphate prices were quoted by "E & M J Metal and Mineral Markets", New York, October, 1944, as follows: per long ton f.o.b. mines, Florida pebble, 77 to 76 per cent, \$5.20; 75 to 74 per cent, \$4.20; 72 to 70 per cent, \$3.20; 70 to 68 per cent, \$2.60 and 68 to 66 per cent, \$2.20.

Canadian imports of phosphate rock during 1943 totalled 260,846 tons valued at \$1,085,080 compared with 271,372 tons worth \$1,053,229 in 1942.

Table 298.—Production of Phosphate in Canada, 1929-1943

Year	Short tons	\$	Year	Short tons	\$
1929.....	1,185	5,380	1937.....	100	900
1930.....	40	760	1938.....	208	1,886
1931.....	.....	.....	1939.....	157	1,712
1932.....	1,316	12,333	1940.....	358	4,039
1933.....	2,214	5,475	1941.....	2,487	33,376
1934.....	81	683	1942.....	1,264	17,431
1935.....	186	1,103	1943.....	1,451	18,385
1936.....	525	4,927			

Table 299.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1943

Year	Superphosphate		Phosphate Rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,513
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948
1937.....	187,801	1,661,245	101,704	728,572
1938.....	180,243	2,193,699	102,125	765,816
1939.....	174,989	2,026,293	96,319	711,508
1940.....	175,046	2,175,615	143,667	1,262,847
1941.....	143,420	1,719,674	156,038	1,573,165
1942.....	177,421	2,748,200	207,842	2,253,517
1943.....	214,340	3,846,027	226,350	2,528,062

PYRITES (Sulphur)

Canadian sulphur production is computed as the sulphur in iron pyrites shipped plus the sulphur recovered from non-ferrous smelter gases. Production in 1943, as thus defined, totalled 257,515 short tons valued at \$1,753,425 compared with a corresponding output of 303,714 tons worth \$1,994,891 in 1942.

No iron pyrites deposits, known as such, have been mined in Canada for some years, and statistics published regarding recent pyrites production refer to by-product iron pyrites recovered in the mining and concentrating of copper-gold-silver ores.

Sulphur employed in the manufacture of sulphuric acid was recovered from smelter gases in 1943 in Ontario and British Columbia. In Ontario, Canadian Industries Limited continued the operation of its acid plant at Copper Cliff, using sulphur dioxide obtained from the smelter of the International Nickel Company, while in British Columbia the Consolidated Mining and Smelting Company of Canada Limited manufactured sulphuric acid and other chemical products at Trail, using the by-product gases of its metallurgical plants.

Iron pyrites was produced in 1943 in the treatment of copper-gold-silver ores at the Aldermac and Noranda mines in northwestern Quebec, and at the Britannia mine in British Columbia; operations at the Aldermac property were discontinued in August and the plant dismantled. In September, the Consolidated Mining and Smelting Company of Canada Limited commenced shipment of iron pyrites from the Sullivan mine for the manufacture of sulphuric acid at Trail.

World production of elemental sulphur in 1942 is estimated by the United States Bureau of Mines at over 4,300,000 long tons.

The United States is the main source of the world production of crude sulphur. The output in 1942 amounted to 3,460,700 long tons, chiefly from the states of Texas and Louisiana.

Sulphur is used in Canada chiefly in the production of sulphide pulp and for use in the making of artificial silk and newsprint. It is used to a large extent also in the manufacture of sulphuric acid, explosives, and rubber, and in the production of fertilizers.

With the construction of new sulphuric plants in Canada and the United States, the consumption of sulphur was increased in 1941 and was further increased in 1942 and 1943.

Sulphur is one of the essential raw materials for war—such as, in the form of sulphuric acid for making explosives. The rayon industry consumes large quantities of sulphur. The expansion of the pulp and paper industry has also created increased demand for sulphur.

According to "Metal and Mineral Markets", New York, the price of sulphur in 1943 remained unchanged at \$16 a long ton, f.o.b. mines. The prices at consumers' plants in Canada vary from \$20 to \$32 according to location, the difference being due to transportation costs. The average for the Dominion in 1943 was about \$27.

Pyrites was quoted October, 1944—per long ton unit of sulphur, c.i.f. United States ports, guaranteed 48 per cent sulphur, Spanish 12 cents, nominal.

Table 300.—Production of Sulphur (x) in Canada 1934-1943

Year	Tons	\$	Year	Tons	\$
1934.....	51,537	515,502	1939.....	211,278	1,668,025
1935.....	67,446	634,235	1940.....	170,630	1,295,013
1936.....	122,132	1,033,055	1941.....	260,023	1,702,796
1937.....	130,913	1,154,992	1942.....	303,714	1,994,891
1938.....	112,395	1,044,817	1943.....	257,515	1,753,425

(*) Sulphur in iron pyrites shipped plus sulphur recovered from non-ferrous smelter gases.

Table 301.—Production in Canada of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid, Etc., Made From Smelter Gases, 1941-1943

	Pyrites (*)			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
			\$		\$		\$
1941							
Quebec.....	298,761	146,826	575,422			146,826	575,422
Ontario.....				10,057	100,570	10,057	100,570
British Columbia.....	4,599	2,303	18,424	(†) 100,837	1,008,370	103,140	1,026,794
Canada.....	303,360	149,129	593,846	110,894	1,108,940	260,023	1,702,786
1942							
Quebec.....	351,570	168,832	673,965			168,832	673,965
Ontario.....				18,634	186,340	18,634	186,340
British Columbia.....	27,923	13,947	111,576	(†) 102,301	1,023,010	116,248	1,134,586
Canada.....	379,493	182,779	785,541	120,935	1,209,350	303,714	1,994,891
1943							
Quebec.....	277,690	136,007	545,229			136,007	545,229
Ontario.....				16,907	169,070	16,907	169,070
British Columbia.....	6,886	3,442	27,536	(†) 101,159	1,011,590	104,601	1,039,126
Canada.....	284,576	139,449	572,765	118,066	1,180,660	257,515	1,753,425

(*) Recovered from copper ore deposits.

(†) Includes elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

Imports into Canada of sulphur or brimstone totalled 218,527 short tons valued at \$3,524,006 in 1943. The sulphur content of iron pyrites exported from Canada in 1943 totalled 104,509 short tons appraised at \$409,597.

Table 302.—Consumption of Sulphur by Specified Canadian Industries, 1940-1943

Industry	1941		1942		1943	
	Tons	\$	Tons	\$	Tons	\$
Wood-pulp.....	201,575	5,062,266	211,466	5,687,331	206,766	5,739,113
Petroleum refining.....	51	2,649	31	1,561	47	2,360
Acids, alkalies and salts.....	44,784	1,091,913	65,056	1,694,232	69,236	1,866,322
Matches.....	65	3,393	80	4,119	76	3,997
Explosives.....	2,934	58,486	2,057	57,631	1,806	55,717
Insecticides.....	962	35,722	1,293	50,310	1,246	34,449
Adhesives.....	82	3,031	89	3,087	93	2,847
Chemicals, miscellaneous.....	3	40	3	27	7	393
Rubber.....	2,067	106,411	1,728	93,042	1,412	76,032
Sugar.....	147	6,877	142	7,411	104	4,913
Fruit and vegetable preparations.....	59	5,206	130	10,685	215	15,610
Other industries (*).....	278	11,603	287	12,248	272	11,466

(*) Starch and glucose, dyeing and finishing of textiles.

SILICA BRICK

The production of silica brick in Canada during 1943 totalled 4,165 M valued at \$295,505 compared with 4,273 M worth \$263,006 in 1942. The manufacture of these refractories was confined, in both years, to the plants of the Dominion Steel and Coal Company, Ltd., at Sydney, Nova Scotia, and the Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both of these companies are processed from crushed silica rock and are utilized in furnace construction and repairs.

Table 303.—Production of Silica Brick in Canada, 1928-1943

Year	M	\$	Year	M	\$
1928.....	3,224	155,502	1936.....	2,393	97,285
1929.....	3,951	173,581	1937.....	3,744	181,126
1930.....	2,418	97,379	1938.....	1,788	100,403
1931.....	900	35,746	1939.....	2,493	124,807
1932.....	93	4,304	1940.....	3,438	182,786
1933.....	636	23,185	1941.....	4,111	238,433
1934.....	2,528	85,945	1942 (*).....	4,273	263,006
1935.....	2,461	96,194	1943.....	4,165	295,505

(*) Largest annual output.

SODIUM CARBONATE (NATURAL)

Production of natural sodium carbonate in Canada during 1943 totalled 468 short tons valued at \$5,148 compared with 256 tons worth \$2,048 in 1942. The output in both years came entirely from deposits located in the province of British Columbia.

Deposits of natural sodium carbonate in the form of "Natron" (sodium carbonate with 10 molecules of water) and also as brine, occur in a number of "lakes" throughout the central part of British Columbia, chiefly in the Clinton mining division near 70 mile House about 20 miles northeast of Clinton, and in the neighbourhood of Kamloops. Since 1921 there has been a small intermittent production from several of these deposits; and the production is marketed in Vancouver for use in the manufacture of soap.

Sodium carbonate, or "soda ash", has many industrial uses, such as in the manufacture of glass and soap, in the purification of oils and of bauxite for the production of aluminium, and in the flotation of minerals. Owing to technical advances, the use of soda ash in the glass industry continued to grow. The next largest use of sodium carbonate is in the production of sodium hydroxide or caustic soda. An interesting new use for sodium carbonate is in the manufacture of "synthetic salt cake" (anhydrous sodium sulphate). Considerable quantities of soda ash are also consumed in the smelting of iron ores.

The price of "soda ash" in 1943 as reported by Canadian Chemistry and Process Industries remained at \$2.00 per bag of 100 pounds throughout the year.

Imports into Canada of soda ash or barilla in 1943 totalled 70,557 short tons valued at \$1,213,818 compared with 65,589 tons worth \$1,540,247 in 1942.

Table 304.—Production of Sodium Carbonate (Natural) in Canada, 1930-1943

Year	Tons	\$	Year	Tons	\$
1930.....	364	4,550	1937.....	286	2,574
1931.....	712	7,351	1938.....	252	2,268
1932.....	495	5,450	1939.....	300	2,400
1933.....	559	5,773	1940.....	220	1,760
1934.....	244	1,920	1941.....	186	1,488
1935.....	242	2,430	1942.....	256	2,048
1936.....	192	1,677	1943.....	468	5,148

Table 305.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries, 1942 and 1943

Industry	Unit of measure	1942		1943	
			\$		\$
Chemicals and allied products (a).....	pound	60,781,598	900,378	55,539,946	769,619
Manufactures of non-metallic minerals (b).....	ton	109,077,366	1,471,513	98,602,000	1,266,581
Pulp and paper.....	pound	8,476	120,465	3,465	117,941
Textiles (dyeing and finishing).....	pound	578,909	11,027	692,854	13,294
Sugar refineries.....	pound	378,112	8,762	347,968	8,257
Dyeing, cleaning and laundry work.....	pound	1,075,469	28,724	1,037,873	28,988
Municipal waterworks.....	pound	843,232	(c)	801,297	(c)

(a) Includes acids, salts, explosives, soap, etc.

(b) Includes coke and gas, glass and petroleum refining.

(c) Not available.

SODIUM SULPHATE

(Glauber's Salt and Salt Cake)

Commercial shipments of natural sodium sulphate in 1943 from Canadian deposits totaled 107,121 short tons valued at \$1,025,151 as compared with the all-time high of 131,258 tons worth \$1,079,692 in 1942. The production in both years came from deposits located in the province of Saskatchewan. The mineral occurs as crystals or in the form of high concentrated brines in many lakes throughout Western Canada. Investigations of the sodium sulphate deposits of Western Canada was started by the Bureau of Mines, Ottawa, in 1921, and over 120,000,000 tons of hydrous salts was proved in the few deposits examined in detail. The operating plants in Western Canada are capable of producing over 900 tons of dried salts a day, and if necessary the tonnage could be greatly increased. Complete data on the world production of salt cake are not available; Germany, before the war, was probably the largest producer of total salt cake and Canada was among the first ten producers. Canada is, however, one of the largest producers of salt cake from natural deposits. Glauber's salt is used widely in the chemical industries, and the demand is increasing. Sodium sulphate is used extensively in the pulp and paper, glass, dye, and textile industries, and to a smaller extent for medicinal purposes and for tanning. It is also used extensively in the smelting of nickel-copper ores for the separation of these metals.

The price for natural anhydrous sodium sulphate from deposits in Western Canada ranged from \$9 to \$10 per short ton f.o.b. plant.

In 1943 Canada imported 11,903 short tons of crude sodium sulphate (salt cake) valued at \$150,496 compared with 7,071 tons worth \$85,479 in 1942. Imports of Glauber's salt in 1943 totalled 1,132,033 pounds valued at \$16,399. Data relating to exports of sodium sulphate are not shown separately in Canadian trade reports.

Table 306.—Production of Natural Sodium Sulphate (x) in Canada, 1930-1943

Year	Short tons	\$	Year	Short tons	\$
1930.....	31,571	293,847	1937.....	79,804	617,548
1931.....	44,957	421,097	1938.....	63,009	553,307
1932.....	22,466	271,736	1939.....	71,485	628,151
1933.....	50,080	485,416	1940.....	94,260	829,589
1934.....	66,821	587,986	1941.....	115,608	931,554
1935.....	44,817	343,764	1942.....	131,258	1,079,692
1936.....	75,598	552,681	1943.....	107,121	1,025,151

(*) All produced in the province of Saskatchewan with the following exceptions:

Includes production in: Alberta, 1937, 80 tons, value \$480
 1938, 89 tons, value \$1,127
 1939, 10 tons, value \$186
 1940, 10 tons, value \$50
 1941, 8 tons, value \$32.

Table 307.—Sodium Sulphate or Salt Cake Used in Specified Canadian Industries, 1942-1943

Industry	1942		1943	
	Tons	\$	Tons	\$
Textile industry.....	860	24,831	734	21,039
Acids, alkalis and salts industry.....	107	2,040	120	1,868
Medicinal and Pharmaceutical industry.....	40	4,626	38	4,142
Pulp and Paper industry.....	70,078	1,303,461	67,292	1,306,215
Glass industry.....	641	12,316	892	18,741
Leather Tanning industry.....	201	7,547	189	7,104
Miscellaneous chemicals industry.....	283	16,591	377	24,173
Copper nickel smelting and refining.....	21,531	(a)	33,885	(a)

(a) Not reported.

STRONTIUM MINERALS

There was no commercial production of strontium minerals in Canada during 1943. In 1941—27 tons of celestite valued at \$280 was shipped from old dumps located on lots 6 and 7, concession 10 of Bagot township, Renfrew county, Ontario.

The following, relating to strontium, is from a review prepared by the Bureau of Mines, Ottawa:

"Several occurrences of celestite (strontium sulphate) of possible economic interest are known in Canada, and in 1920-21, some ground material produced from a deposit in Bagot township, Ontario, was sold to the paint trade. The material from this deposit is coarsely-fibrous in character and is not very pure, containing about 18 per cent of barium sulphate. It is accordingly not favoured for chemical use, but is regarded as suitable for paints and general filler or loader use. The old pit was pumped out in 1941 and a few tons of ore were scaled down from a small drift. This, along with some stockpile material was shipped to Montreal for grinding. The product was used in the paint trade as a substitute for barite, but is reported to have found little favour, and no further work was done. Celestite of similar character and analysis occurs at some of the old fluorspar mines of the Madoc area in Ontario, and part of it might be recoverable from the waste dumps.

"Celestite, analyzing 98 to 99 per cent strontium sulphate occurs as a small vein of coarse platy crystals in Lansdowne township, Ontario and some of it was mined many years ago.

"World production of strontium minerals is estimated at 5,000 to 7,000 tons a year. England is the principal source of supply, with Germany next. The United States produced about 350 tons in 1940, exclusive of celestite used for oil-drilling. Important deposits are reported to occur in India and Newfoundland, but there has been no production from these sources as yet.

"Celestite is the principal source of strontium used in the manufacture of the various strontium salts, and strontianite a less common mineral, is used for the same purpose. The nitrate, carbonate, and hydrate are the most important of the strontium compounds used in industry and medicine. Strontium nitrate is employed mainly in pyrotechnics, for fireworks, railroad signal flares, and military flares and rockets, to which it imparts the characteristic strong red flame colour of the element. Other strontium compounds are employed in tracer bullets and shells. The hydrate is used chiefly in the refining of beet sugar by the Scheibler process. In North America, however, sugar is refined mainly by the Steffens, or lime, process. The carbonate is reported to be used to some extent as a batch ingredient in the manufacture of certain kinds of glass, glazes, and enamels, and as a fluxing and desulphurizing and dephosphorizing agent in iron and steel. Strontium chloride powder finds limited use in refrigerators working on the solid absorption principle. Ground celestite is used in fairly large quantities for purifying caustic soda in the rayon industry, and some impure material has been ground and employed as a barite substitute for weighting oil-drilling muds. Interest has also been shown in the possibilities of the carbonate and the sulphate in glass and white wares.

"Strontium metal, made from either the natural sulphate or carbonate, is used in limited quantities in certain alloys, mainly of copper, tin, lead, zinc, and cadmium."

"E and M J Metal and Mineral Markets", New York, quoted celestite, October, 1944—per ton in carload lots, 92 per cent SrSO_4 finely powdered, \$45. Strontianite—per ton, lump in carload lots, minimum 84 to 86 per cent SrCO_3 , \$55 nominal.

Data pertaining to imports of strontium minerals or compounds are not shown separately in Canadian trade reports.

VOLCANIC DUST

Commercial mine shipments of volcanic dust in Canada during 1943 totalled 50 short tons valued at \$257. These were made from a deposit located at Rockglen in the province of Saskatchewan. The 1943 output was the first to be reported in Canada since 1934, when production amounted to 31 tons valued at \$620, one tone of which came from Waldeck, Saskatchewan and 30 tons from Williams Lake, British Columbia.

The Bureau of Mines, Ottawa, describes volcanic dust (pumiceite or pumice dust) as a natural glass or silicate, atomized by volcanic explosions and thrown into the air in great clouds which ultimately settle, forming beds of varying thickness, often hundreds of miles from its source of origin. Deposits are found in Canada in Saskatchewan, Alberta and British Columbia.

The war cut off supplies of high quality Italian pumice from Lipari Island near the north coast of Sicily, but suitable material is being produced in California.

In the past, about 60 per cent of the United States output was used as the abrasive base in scouring and cleansing compounds and to a lesser extent for glass bevelling, polishing aluminium, etc., but in 1942, about 43 per cent was used for these purposes and 36 per cent as a concrete admixture and concrete aggregate. Some of the United States volcanic dust was used in the manufacture of fireproof walls, building tiles and slabs, and in the refining of petroleum. The use of volcanic dust as a ceramic raw material has not been extensive in the United States, although its suitability for such use has been indicated by laboratory and industrial applications, but only on material relatively free from iron. In most of the deposits, however, this iron is in the form of a complex silicate and attempts to remove it by concentration, magnetic separation, leaching, and other methods have been unsuccessful. Volcanic dust of a certain purity has been used in place of feldspar in ceramic bodies whose colour is of secondary importance. Some promising results have been achieved, however, with decolorizers, such as selenium and arsenic trioxide. Volcanic dust has possibilities for use as glaze component, in low-cost glass, and in bricks when mixed with plastic clays.

Imports are grouped with a number of similar products (pumice, pumice stone, lava, and calcareous tufa) the value of which totals approximately \$40,000 annually.

Prices are not quoted, but in the United States sales values for cleansing and scouring were about \$7.50 per ton; for acoustic plaster, \$27, for concrete admixture and aggregate, \$1.25 per ton.

Table 308.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1942 and 1943

Item	Unit of measure Quantity	1942		1943	
		Quantity	Value	Quantity	Value
			\$		\$
Barite.....	ton	19,867	188,144	24,474	279,253
Diatomite.....	ton	365	9,088	98	3,331
Fluorspar.....	ton	6,199	146,039	11,210	318,424
Garnets (schist).....	ton	17	176		
Graphite.....			117,904		197,431
Grindstones (b).....	ton	216	10,000	164	6,225
Magnesium sulphate.....	ton	1,140	38,760		
Magnetitic dolomite (c).....			1,059,374		1,260,056
Mineral waters.....	Imp. gal.	157,085	74,505	139,611	67,541
Phosphate (a).....	ton	1,264	17,431	1,451	18,385
Silica brick.....	M	4,273	263,006	4,165	295,505
Sodium carbonate.....	ton	256	2,048	468	5,148
Sodium sulphate.....	ton	131,258	1,079,692	107,121	1,025,151
Volcanic dust.....	ton			50	257
Total (Gross).....			3,006,167		3,476,707
Sulphur production (*).....	ton	303,714	1,994,891	257,515	1,753,425

(a) Represents apatite mined in Quebec and Ontario, usually a by-product in mica production.

(b) Includes sharpening stones, etc.

(c) Includes the value of calcined brucite granules shipped from Wakefield, Quebec.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct). General statistics relating to production of sulphur included with those of the copper-gold mining and non-ferrous smelting industries.

Table 309.—Principal Statistics Relating to Miscellaneous Non-Metal Mining Industries in Canada, 1942 and 1943

	1942	1943
Number of plants.....	64	54
Capital employed.....	\$ 4,919,871	\$ 3,522,842
Number of employees—On salary.....	88	84
On wages.....	723	827
Total.....	811	911
Salaries and wages—Salaries.....	\$ 142,266	\$ 155,593
Wages.....	\$ 999,806	\$ 1,207,933
Total.....	\$ 1,142,072	\$ 1,363,526
Selling value of products (gross).....	\$ 3,006,167	\$ 3,476,707
Cost of fuel and electricity.....	\$ 656,538	\$ 823,347
Cost of process supplies used.....	\$ 296,322	\$ 382,648
Cost of containers.....	\$ 2,475	\$ 2,475
Selling value of products (net).....	\$ 2,053,307	\$ 2,268,237

Table 310.—Capital Employed in the Miscellaneous Non-Metal Mining Industries in Canada, 1943

	\$
Present cash value of the land (excluding minerals).....	229,019
Present value of buildings, fixtures, machinery, tools and other equipment.....	1,630,727
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	529,714
Inventory value of finished products on hand.....	165,655
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	967,727
Total.....	3,522,842

Table 311.—Wage-Earners, by Months, in the Miscellaneous Non-Metal Mining Industries in Canada, 1940-1943

Month	1940	1941	1942	1943				
				Mine			Mill	
				Surface		Under-ground	Male	Female
				Male	Female			
January.....	352	451	561	246	.....	97	490	2
February.....	352	463	594	230	.....	94	472	2
March.....	392	452	600	237	.....	96	487	2
April.....	359	473	622	265	.....	90	453	2
May.....	482	559	639	266	.....	89	481	2
June.....	472	682	827	295	.....	85	497	2
July.....	548	667	789	302	.....	77	468	2
August.....	517	696	819	294	.....	88	485	2
September.....	604	695	770	255	.....	93	510	2
October.....	614	718	789	253	.....	77	449	2
November.....	531	659	803	227	.....	78	502	2
December.....	451	603	759	161	.....	55	493	2
Average.....	450	601	723	257	.....	84	484	2

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this Chapter are those industries producing structural materials from non-metallic minerals, rocks and clays of Canadian origin. These industries include those firms engaged in the production of Clay Products, Portland Cement, Lime, Sand, Gravel and Stone.

The combined production of these domestic materials in 1943 totalled \$42,010,254 compared with \$45,729,807 in 1942, or a decrease of 8 per cent. Compared with the preceding year, declines in both quantities and values were recorded for clay products, cement and stone. The value of sand and gravel produced was approximately the same as in 1941, and relatively small increases were realized in the quantity and value of the lime output.

The quality of structural materials produced in Canada compares favourably with that of other countries. Most of the larger plants producing cement, clay products, lime, stone and sand and gravel are equipped with modern machinery and the Dominion is endowed with practically inexhaustible deposits of most primary materials required in any building or construction project of the future.

There has been an increasing consumption of stone and lime for other than building purposes. This has been particularly evident in recent years and is the result of expansion in certain industries where these materials are utilized in various chemical processes. Shipments of stone and lime for these purposes are classified, for convenience, with data relating to production of these same materials for structural purposes. However, statistics pertaining to their consumption for industrial purposes are segregated in the following tables.

Table 312.—Gross Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1938-1943

Province	1938	1939	1940†	1941	1942	1943
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	1,611,111	1,829,207	1,855,771	1,330,888	1,980,912	1,597,791
New Brunswick.....	2,188,889	1,911,041	936,161	1,145,412	1,305,343	911,121
Quebec.....	11,619,514	12,319,773	15,001,749	16,631,657	17,723,293	15,863,115
Ontario.....	11,997,177	12,856,694	16,636,844	18,652,999	16,557,804	15,414,525
Manitoba.....	1,805,875	1,646,797	2,600,304	2,197,095	2,317,933	2,402,647
Saskatchewan.....	781,224	556,973	906,181	631,732	707,123	932,412
Alberta.....	1,627,462	1,947,453	2,971,550	2,626,277	2,836,160	2,752,839
British Columbia.....	2,247,414	2,314,821	2,795,389	3,416,996	3,564,405	3,246,623
Canada—Gross Value.....	33,878,666	35,382,759	43,703,949	46,633,056	46,992,973	43,121,073
Net value.....	28,446,299	29,628,817	34,893,571	35,865,916	35,334,369	32,464,633

† Includes value of cement containers 1940 to 1943.

NOTE: For statistics relating to employment, etc., in these combined industries see totals in Tables 27 and 28, Chapter 1.

Table 313.—Value of Construction Contracts Awarded, by Provinces, 1938-1943

(MacLean Building Reports Ltd.)

Province	1939	1940	1941	1942	1943
	\$	\$	\$	\$	\$
Maritimes.....	16,146,300	21,142,100	36,736,400	26,305,500	14,875,400
Quebec.....	62,846,600	96,326,300	154,541,200	92,235,500	61,816,700
Ontario.....	82,605,500	146,806,100	145,598,600	108,679,500	83,025,300
Manitoba.....	5,374,400	28,003,700	11,701,600	13,914,300	10,083,900
Saskatchewan.....	3,246,100	12,566,700	11,098,700	5,480,200	3,970,000
Alberta.....	5,234,900	23,940,100	15,598,800	14,401,100	18,529,300
British Columbia.....	11,724,700	17,224,800	18,716,000	20,578,000	13,803,300
Canada.....	187,178,500	346,009,800	393,991,300	281,594,100	206,103,900

Table 314.—Total Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments 1937 to 1943

(Construction Branch, Dominion Bureau of Statistics)

	\$
1937.....	351,874,114
1938.....	353,223,285
1939.....	373,203,680
1940.....	474,122,778
1941.....	639,750,624
1942.....	635,649,570
1943.....	572,426,551

Table 315.—Types of Canadian Construction 1940-43

(Construction Branch, Dominion Bureau of Statistics)

*Type of Construction	1940	1941	1942	1943
	\$	\$	\$	\$
Total Value of Construction.....	474,122,778	639,750,624	635,649,570	572,426,551
Building Construction.....	257,800,560	374,491,173	351,774,680	301,884,888
Residential.....	59,925,197	87,586,340	76,346,090	63,684,367
Institutional.....	17,208,419	15,174,464	14,246,025	13,148,233
Commercial.....	41,748,521	41,157,146	30,638,095	26,439,561
Industrial (includes factories, warehouses, mine buildings, etc.)....	80,624,101	177,698,268	159,346,630	140,396,554
Other (includes armouries, barracks, hangars, etc.).....	58,294,322	52,874,955	71,197,840	58,216,173
Engineering, Harbours, Rivers, etc.....	164,831,545	200,656,038	217,279,062	203,527,830
Streets, highways, etc.....	60,468,279	68,358,529	59,619,536	66,582,959
Bridges, watermains, sewers, dams, reservoirs, etc.....	23,093,053	40,490,145	34,044,730	30,256,377
Electric stations and transmission lines.....	33,718,009	37,090,038	60,697,808	30,843,814
Docks, wharves, piers, etc.....	4,809,071	6,475,872	10,099,471	10,282,332
Other engineering (includes landing fields, parks, canals, dredging, pile driving, etc.).....	42,743,133	48,241,454	52,817,517	65,562,348
Building Trades (Jobbing).....	51,490,673	64,603,413	66,595,828	67,013,833

* This survey is based on reports received from General and Trade Contractors and Subcontractors, Municipalities, the Harbours Board and Dominion and Provincial Departments, and covers alterations, maintenance and repairs, as well as new construction.

Table 316.—The following table gives the total value of construction contracts awarded in Canada from 1925 to 1943, also index numbers of wholesale prices of building materials, and index numbers of wage rates.

Year	Value of construction contracts awarded in Canada (a)	Average index numbers of employment in building construction (1926=100) (b)	Average index numbers of wholesale prices of building materials (1926=100) (c)	Index of wage rates in the building trades (1935-39=100) (d)
1925.....	297,973,000	75.8	102.9	103.1
1926.....	372,947,900	100.0	100.0	104.2
1927.....	418,951,600	108.7	96.1	108.5
1928.....	472,032,600	112.0	97.4	112.3
1929.....	576,651,800	135.3	99.0	119.6
1930.....	456,999,600	134.3	90.8	123.0
1931.....	315,482,000	104.3	81.9	118.5
1932.....	132,872,400	54.1	77.2	107.9
1933.....	97,289,800	38.5	78.3	95.6
1934.....	125,811,500	47.8	82.5	93.7
1935.....	160,305,000	55.4	81.2	96.7
1936.....	162,538,000	55.4	85.3	97.3
1937.....	224,056,700	60.1	94.4	100.1
1938.....	187,277,900	60.1	89.1	102.5
1939.....	187,178,500	62.1	89.7	103.3
1940.....	346,009,800	83.5	95.6	105.7
1941.....	393,991,300	139.5	107.3	111.7
1942.....	281,594,100	157.9	115.2	118.4
1943.....	206,103,900	160.3	121.2	128.8

(a) Compiled by MacLean Building Reports Ltd.

(b) Employment Statistics Branch, Dominion Bureau of Statistics.

(c) Internal Trade Branch, Dominion Bureau of Statistics.

(d) Labour Department; 8 trades 1921-1926; 9 trades from 1927 to 1942; and 8 in 1943; 13 cities to 1927; 14 cities to 1930, hereafter 31 to 42 cities.

THE CEMENT MANUFACTURING INDUSTRY

Producers' sales of Portland cement in 1943, as reported by the Canadian cement industry, totalled 7,302,289 barrels (350 pounds each) valued at \$11,599,033 compared with 9,126,041 barrels valued at \$14,365,237 in 1942. Of the 1943 sales, 3,394,895 barrels were produced in Quebec plants; 1,972,009 barrels in Ontario; 793,913 barrels in Manitoba; 606,703 barrels in Alberta, and 534,769 barrels in British Columbia. Imports into Canada of cement, other than in cement manufactures, totalled 18,577 barrels valued at \$83,975 in 1943; exports of cement in the same period amounted to 172,601 barrels worth \$344,004. The high and low Canadian producers' prices per barrel in 1943 were, respectively, \$2.70 and \$1.25.

The following tonnages of primary materials of mineral origin were used during 1943 in the manufacture of the final product: Limestone, 1,918,742; clay, 165,345; shale 75,460; gypsum, 47,034; silica sand, 19,473 and iron oxides, 1,502.

The number of firms reporting commercial production of Portland cement in Canada during 1943 was 3 and the plants in operation numbered 8. Capital employed totalled \$50,438,932 and the industry distributed \$2,154,218 in salaries and wages to 1,209 employees. The total value of fuel and electricity used during the year under review amounted to \$3,089,380, of which \$2,259,931 were expended for coal and \$783,806 for purchased electricity. Process supplies consumed, including chemicals, explosives, drill steel, gypsum, silica sand, purchased limestone, etc., were valued at \$1,356,890.

Portland cement, the principal raw materials for which are limestone and clay, is manufactured in five provinces of Canada. In addition to the standard or ordinary variety of Portland cement several other varieties, including high-early-strength, alkali-resistant, and white cement are made in this country, the last named, however, is made from imported clinker.

All Canadian plants except one making cement from domestic raw materials are using the wet process. Remarkable uniformity in the chemical and physical properties of the standard variety of cement is achieved throughout the country as the result of close technical control and improvements in plant equipment.

Production was at first greatly stimulated by the war where cement played an important part in the wartime construction program, but now that this program is completed the demand for Portland cement has lessened. A report issued by the Bureau of Mines, Ottawa, states that when the war is over, a large increase in demand for Portland cement is to be expected in connection with the lifting of restrictions on non-military construction. This will permit a start on the program of highway, public works, and industrial construction, plans for which are already made.

Complete data relating to world production of cement have not been available for some years.

Table 317.—Summary Statistics of Cement Production, Sales, Etc., in Canada, 1942 and 1943

	1942		1943	
	Barrels (*)	Value	Barrels (*)	Value
		\$		\$
Output.....	8,634,184		8,025,113	
Sold or used.....	9,126,041	14,365,237	7,302,289	11,599,033
Stocks on hand December 31.....	873,819		1,596,643	
IMPORTS—				
Portland cement and hydraulic or water lime.....	26,320	116,126	18,577	83,975
Manufactures.....		26,807		27,723
Total Imports.....				
EXPORTS—				
Portland cement.....	273,880	476,284	172,601	344,304
Apparent Consumption.....	8,878,481		7,148,265	

(*) 1 barrel=350 pounds.

Table 318.—Production and Apparent Consumption of Cement in Canada, 1934-1943

Year	Sold or Used		Apparent Con- sumption
	Barrels	\$	Barrels
1934.....	3,783,226	5,667,946	3,727,521
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656
1937.....	6,168,971	9,005,867	6,157,485
1938.....	5,519,102	8,241,350	5,478,180
1939.....	5,731,204	8,511,211	5,591,328
1940.....	7,559,648	11,775,345	7,272,886
1941.....	8,368,711	13,063,588	8,063,416
1942.....	9,126,041	14,365,237	8,878,481
1943.....	7,302,289	11,599,033	7,148,265

Table 319.—Producers' Sales of Cement in Canada, by Provinces, 1941-1943

Province	1941		1942		1943	
	Barrels	Value (*)	Barrels	Value (*)	Barrels	Value (*)
		\$		\$		\$
Quebec.....	4,048,749	5,798,188	4,446,416	6,487,078	3,394,895	4,890,578
Ontario.....	2,748,854	4,019,656	2,784,782	3,998,204	1,972,000	2,872,732
Manitoba.....	576,648	1,274,392	654,855	1,374,498	793,913	1,503,416
Alberta.....	492,515	985,030	668,043	1,307,353	606,703	1,176,442
British Columbia.....	501,945	986,322	571,945	1,198,014	534,769	1,146,865
Canada.....	8,368,711	13,063,588	9,126,041	14,365,237	7,302,289	11,599,033

(*) Less value of containers.

Table 320.—Number and Capacity of Kilns in Canadian Cement Plants, 1934-1943

Year	Total kilns		Kilns in use during the year	
	Number	Total capacity barrels per 24 hours	Number	Total capacity barrels per 24 hours
1934.....	41	43,722	(*)	(*)
1935.....	20	32,650	(*)	(*)
1936.....	19	33,000	(*)	(*)
1937.....	18	33,900	(*)	(*)
1938.....	21	35,200	10	23,100
1939.....	21	35,000	11	23,700
1940.....	21	35,000	13	27,950
1941.....	20	33,050	16	30,350
1942.....	19	34,650	17	32,450
1943.....	19	33,750	15	30,296

(*) Data not recorded.

Table 321.—Specified Materials Used in Canadian Cement Plants, 1934-1943

Year	Shale	Limestone	Gypsum	Silica sand	Clay	Iron oxides (†)
	Tons	Tons	Tons	Tons	Tons	Tons
1934.....	(*)	806,546	19,172	(*)	(*)	(*)
1935.....	(*)	818,443	21,611	5,047	(*)	(*)
1936.....	(*)	1,180,358	25,447	8,549	94,943	(*)
1937.....	(*)	1,465,168	33,691	9,281	195,877	444
1938.....	13,821	1,344,868	51,975	9,465	143,421	22
1939.....	27,241	1,379,858	31,492	7,942	105,982	16
1940.....	18,347	1,765,944	38,903	15,298	144,152	170
1941.....	26,837	2,086,781	49,031	16,110	185,954	614
1942.....	30,498	2,165,750	49,816	20,711	188,202	2,094
1943 (a).....	(b) 75,460	1,918,742	47,034	19,473	166,345	1,502

(*) Data not recorded.

(†) Produced from iron pyrites by the chemical industry.

(a) Value of these materials purchased in 1943 totalled \$408,289.

(b) Prior to 1943 shale consumed in British Columbia plants was included with limestone.

Table 322.—Coal Used in Canadian Cement Plants, 1934-1943

Year	Canadian		Foreign	
	Tons	\$	Tons	\$
1934.....	69,853	367,880	60,877	330,432
1935.....	78,477	433,347	53,338	291,741
1936.....	119,903	635,631	66,460	367,740
1937.....	145,791	760,766	90,925	513,417
1938.....	127,812	656,187	89,172	499,812
1939.....	190,538	1,010,071	16,141	82,336
1940.....	185,325	1,108,287	85,885	513,224
1941.....	125,740	772,829	203,905	1,331,448
1942.....	156,544	1,003,490	192,105	1,305,383
1943.....	98,135	595,385	225,741	1,664,546

Table 323.—Quantity and Value of Electricity Purchased by Canadian Cement Companies, 1934-1943

Year	Kilowatt hours	\$ (*)	Year	Kilowatt hours	\$ (*)
1934.....	48,457,250	496,138	1939.....	105,938,210	589,190
1935.....	51,958,859	494,538	1940.....	126,737,622	690,266
1936.....	62,038,700	553,212	1941.....	151,845,680	748,631
1937.....	61,045,600	606,969	1942.....	154,502,140	771,092
1938.....	59,705,200	563,858	1943.....	150,929,220	783,806

(*) Includes service charges.

Table 324.—Principal Statistics of the Cement Manufacturing Industry in Canada, 1941-1943

	1941	1942	1943
Number of firms.....	3	3	3
Number of plants.....	8	8	8
Capital employed.....	\$ 51,108,294	\$ 51,121,894	\$ 50,438,932
Number of employees—On salary.....	87	89	91
On wages.....	1,148	1,152	1,118
Total.....	1,235	1,241	1,209
Salaries and wages—Salaries.....	\$ 190,771	\$ 200,779	\$ 215,137
Wages.....	\$ 1,670,160	\$ 1,858,558	\$ 1,939,081
Total.....	\$ 1,860,931	\$ 2,059,337	\$ 2,154,218
Selling value of products (Gross).....	\$ 14,323,372	\$ 15,628,403	\$ 12,709,852
Cost of fuel and electricity.....	\$ 2,897,383	\$ 3,127,264	\$ 3,089,380
Cost of process supplies (*).....	\$ 887,041	\$ 1,024,057	\$ 1,356,890
Value of containers.....	\$ 1,259,784	\$ 1,263,166	\$ 1,110,819
Net value of products sold.....	\$ 9,279,164	\$ 10,213,916	\$ 7,152,763

(*) Other than fuel and electricity.

Table 325.—Capital Employed in the Cement Industry in Canada, 1943

	\$
CAPITAL EMPLOYED AS REPRESENTED BY—	
Present cash value of the land.....	9,327,061
Present value of buildings, fixtures, machinery, tools and other equipment.....	30,414,868
Inventory value of materials on hand, ore in process, fuel and miscellaneous supplies on hand.....	1,040,989
Inventory value of finished products on hand.....	1,695,452
Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.).....	7,960,562
Total.....	50,438,932

Table 326.—Wage-Earners on the Last Day of Each Month, or Nearest Representative Date, 1940-1943

Month	1940	1941	1942	1943		
				Quarry	Mill	
					Male	Female
January.....	736	1,051	1,078	152	946	.....
February.....	711	1,058	1,092	154	959	.....
March.....	795	1,084	1,111	157	956	.....
April.....	974	1,169	1,148	132	978	.....
May.....	1,021	1,177	1,141	149	898	21
June.....	1,041	1,219	1,182	168	944	33
July.....	1,046	1,221	1,212	166	951	48
August.....	1,052	1,177	1,193	161	956	58
September.....	1,111	1,197	1,188	165	927	55
October.....	1,146	1,158	1,149	155	916	55
November.....	1,100	1,145	1,175	153	910	26
December.....	923	1,124	1,128	151	889	19

THE CLAY AND CLAY PRODUCTS INDUSTRY

The industrial clays of Canada may be classified as common clays, stoneware clays, fireclays, and china clays. Statistically, the ceramic industry of Canada is conveniently classified into two divisions: (1) Production from domestic clays, which includes the production of building brick, structural tile, drain tile, roofing tile, stoneware, sewer pipe, pottery and refractories, and (2) production from imported clays, which includes the manufacture of electrical porcelains, sanitary ware, sewer pipe, table ware, pottery, ceramic floor and walltile, and various kinds of fireclay refractories. Data relating to the production of glass, cement and artificial abrasives are contained in separate reports.

A total of 129 plants, representing in the aggregate, a capital investment of \$22,701,065, operated in the domestic and imported clay products industries in Canada during 1943. These two industries provided employment for 3,290 persons during the year; their earnings totalled \$4,678,202. The combined production in 1943 was valued at \$10,993,609 compared with \$12,478,951 in 1942.

1. PRODUCTION FROM DOMESTIC CLAYS

The gross value of Canadian producers' sales of domestic clays and products made from same totalled \$6,608,193 in 1943 compared with \$7,081,723 in 1942, and \$13,904,643—the all-time high record established in 1929. Commercial production of domestic clay products in 1943 was reported from every province except Prince Edward Island; no output of these materials has as yet been recorded for the Yukon and Northwest Territories. Of the total value of sales in 1943, Ontario and Quebec firms contributed \$2,453,829 and \$1,504,428, respectively.

Sales of building brick in 1943 totalled 138,678M, valued at \$2,808,764. Sewer pipe shipments aggregated \$1,116,846; hollow blocks, roofing and floor tile \$847,311; drain tile \$390,377; pottery, including earthenware, \$701,144; bentonite \$117,047, and fireclay, firebrick and fireclay blocks \$491,395.

The number of firms reported as active in the Canadian domestic clay products industry during 1943 totalled 101; of these, 51 were located in Ontario, 15 in Quebec, 10 in Alberta, 7 in British Columbia and the remainder in Nova Scotia, New Brunswick, Saskatchewan and Manitoba. Capital employed by the industry was reported at \$17,162,747, employees numbered 2,173, and salaries and wages paid amounted to \$2,909,841. Fuel and electricity used in 1943 totalled \$1,157,471 and chemicals and various other process supplies consumed were valued at \$104,336.

Imports into Canada of clay and various clay products in 1943 were appraised at \$13,446,817 compared with \$14,918,338 in 1942. The value of clay products exported from Canada in 1943 was \$458,529 as against \$423,636 in the preceding year.

The following information is taken from a report "Clays and Clay Products 1943" as prepared by the Bureau of Mines, Ottawa:

"Compared to world production, the value of ceramic products manufactured in Canada is small, and large quantities of the various kinds are imported annually.

"Common clays suitable for the production of building brick and tile are found in all the provinces of Canada.

"The largest production in Canada of stoneware clay or semi-fireclays comes from the Eastend and Willows area, Saskatchewan. Large quantities of the clays from the area are selectively mined and shipped to Medicine Hat, Alberta, where, owing to the availability of cheap gas fuel, they are used extensively in the manufacture of stoneware, sewer pipe, pottery, tableware, etc.

"Stoneware clays and moderately refractory fireclays occur near Shubenacadie and Musquodoboit, Nova Scotia. Some of the Musquodoboit clay is used for the production of pottery, but it has not been extensively developed for ceramic use.

"Stoneware clays or low-grade fireclays occur near Williams Lake, and Chimney Creek Bridge in British Columbia; in the Cypress Hills of Alberta; and near Swan River, Manitoba; but they are difficult of access and have not been developed.

"Two large plants and a few small plants manufacture fireclay refractories from domestic clay. At one plant, about 50 miles south of Vancouver, a high-grade, moderately plastic fireclay is extracted by underground mining from the clay beds in the Sumas Mountain, and the plant manufactures firebrick and other refractory materials. Another plant at Claybank, Saskatchewan, by selective mining, utilizes the highly plastic refractory clays from the "White Mud" beds of southern Saskatchewan.

"A small amount of the most refractory clays in the deposits near Shubenacadie is mined and used by the steel plant at Sydney, Nova Scotia, for refractory purposes and some of the Musquodoboit clay is used for stove linings. Almost all other manufacturers of fireclay refractories (including high temperature cements, plastic refractories, etc.) use imported clay.

"China clay (kaolin) has been produced commercially in Canada only from the vicinity of St. Remi d'Amherst, Papineau county, Quebec, where mining operations were carried on for several years prior to 1923. The large-scale operation of this deposit has been under consideration for a number of years and a company was organized a few years ago to extract the kaolinized material by underground mining, to refine it into high-grade china clay, and to recover washed silica sand as a by-product. Following its reorganization as Canada China Clay and Silica Products, Limited, the company constructed a modern plant equipped to carry out the washing process in accordance with the most up-to-date and scientific methods. The plant has been producing glass sand regularly. The Canadian production of grades of silica sand suitable for the glass trade is of importance, now that the Belgian source of supply has been cut off. Canadian Kaolin-Silica Products' property at Lac Remi, Quebec, which was operated chiefly for the production of high-grade silica sand, has been idle since the destruction of the plant by fire a few years ago.

"Several other interesting occurrences of kaolin have been discovered in Quebec in recent years. One of these, located on Thirty-One Mile Lake, near Point Comfort, Hull county, is being explored and portions of the deposit yield china clay of a high grade in the crude state. The extent and uniformity of the deposit is not as yet proved, but its possibilities as a source of high-grade fireclay are receiving attention. Kaolin has also been discovered near Brebeuf; on Lake Labelle; and near Chateau Richer in Quebec, but there has been little exploratory work on the deposits.

"Important deposits of high-grade, plastic, white-burning and buff-burning clays occur on the Mattagami, Abitibi, and Missinabi Rivers in northern Ontario. Some of these can be classed as china clays, others as fireclays, and still others as ball clays. The deposits have attracted considerable interest in recent years, but effort to develop them have been handicapped owing to the distance of the deposits from industrial centres, and to the lack of transportation facilities.

"In British Columbia, along the Fraser River, about 25 miles above Prince George, is an extensive clay deposit, parts of which yield a high grade of china clay. As china clay from England is difficult to obtain on the West coast, owing to shipping risks, consideration is being given to the possibility of using material from this deposit as a source of china clay suitable for the pulp and paper trade.

"In the manufacture of porcelain; sanitary ware, dinner ware, ceramic floor and wall tile, etc., china clay and ball clay from England has been used almost entirely. Separate production figures are not published for these classes of ceramic ware as there are only one or two producers in each case. Canada also imports large quantities of china clay for use in the production of paper; in the rubber industry; and for other industrial purposes.

"Ball clays of high bond strength occur in the "White Mud" beds of southern Saskatchewan, but as yet they have not been developed.

"Activated clays for oil bleaching are largely imported. The value of such clays imported into Canada by oil refineries in 1943 was \$295,066, compared with \$348,068 in 1942. Fuller's and infusorial earths are also imported for use in sugar refineries, vegetable oil mills, etc. It has been reported that certain western bentonitic materials have been finding a market in Canada for oil bleaching purposes."

Table 327.—Production (Total Sales) of Clay Products From Domestic Clays, 1934-1943

Year	\$	Year	\$
1934.....	2,680,410	1939.....	5,151,236
1935.....	3,012,563	1940.....	6,344,547
1936.....	3,471,027	1941.....	7,575,336
1937.....	4,516,859	1942.....	7,081,723
1938.....	4,536,084	1943.....	6,608,193

Table 328.—Production (Total Sales) of Clay Products, by Provinces, 1939-1943 (Gross Values)

Province	1939	1940	1941	1942	1943
	\$	\$	\$	\$	\$
Nova Scotia.....	339,952	490,543	529,435	618,441	478,571
New Brunswick.....	129,955	171,745	193,643	246,041	216,446
Quebec.....	1,274,776	1,546,246	1,944,358	1,741,297	1,504,428
Ontario.....	2,346,638	2,508,540	3,087,616	2,549,486	2,453,829
Manitoba.....	78,892	102,906	84,817	80,890	132,382
Saskatchewan.....	148,774	164,828	224,897	271,325	348,725
Alberta.....	461,079	838,856	952,144	1,013,497	978,649
British Columbia.....	371,140	520,833	558,426	560,746	496,163
Canada.....	5,151,236	6,344,547	7,575,336	7,081,723	6,608,193

Table 329.—Production (Sales) of Domestic Clay and Clay Products in Canada, 1942 and 1943

Product	Unit of measure	Sales or shipments			
		1942		1943	
		Quantity	\$	Quantity	\$
Clay—Bentonite.....	ton	1,616	44,204	(*)	117,047
Fireclay.....	ton	5,601	40,722	5,653	42,122
Kaolin.....	ton	408	6,130	93	1,531
Other clay.....	ton	24,803	71,826	20,638	101,036
Fireclay blocks and shapes.....			210,246		256,655
Firebrick.....	M	3,816	197,830	3,644	192,618
Brick—Soft mud process—Face.....	M	11,385	233,251	9,260	206,826
Common.....	M	20,387	325,762	14,195	209,508
Stiff mud process—Face.....	M	39,104	872,287	34,623	867,630
(wire cut) Common.....	M	59,901	893,488	51,000	829,365
Brick—Dry press—Face.....	M	12,871	278,701	10,504	256,362
Common.....	M	25,145	404,730	15,681	243,446
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	11	676	3,190	191,424
Sewer brick.....	M	513	9,480	225	4,203
Paving brick.....	M	153	9,353	151	8,967
Structural tile—					
Hollow blocks (including fireproofing and load-bearing tile).....	ton	109,905	1,082,573	84,469	819,535
Roofing tile.....			32		827
Floor tile (quarries).....			23,705		26,949
Drain tile.....	M	11,659	329,035	13,001	390,377
Sewer pipe (including copings, flue linings, conduits, etc.).....			1,392,545		1,116,846
Pottery, glazed or unglazed (including coarse earthenware, sanitary ware, stoneware, flower pots, and all other pottery).....			646,088		701,144
Other products.....			9,059		23,775
Total.....			7,081,723		6,608,193

In addition to the clays recorded in the above table, there were 165,345 tons of ordinary clay consumed in Canada during 1943 in the production of Portland cement; the corresponding consumption in 1942 was 188,202 tons. Also consumed by the Canadian cement industry in 1943 were 75,460 tons of shale.

(*) Not published.

Table 330.—Production of Building Brick in Canada, 1934-1943

		Soft mud process		Stiff mud process (wire cut)		Dry press		Fancy or ornamental brick	Sewer brick	Total
		Face	Common	Face	Common	Face	Common			
1934.....	M	4,904	14,256	23,800	30,317	6,005	6,440	43	307	86,072
	\$	76,247	183,585	494,341	424,131	130,392	66,616	2,625	5,992	1,383,929
1935.....	M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538
	\$	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167
1936.....	M	6,097	24,180	30,218	35,592	8,961	10,241	25	418	115,732
	\$	111,378	302,690	575,765	484,078	165,924	100,785	1,374	6,778	1,748,772
1937.....	M	9,904	23,636	37,610	55,689	12,565	14,136	55	175	153,770
	\$	175,544	316,534	735,615	755,630	233,542	152,062	2,972	2,777	2,375,276
1938.....	M	10,838	24,104	34,179	50,734	13,125	15,536	63	228	148,807
	\$	208,610	313,082	671,471	681,744	266,039	192,741	4,175	3,581	2,341,443
1939.....	M	10,927	26,652	45,998	51,114	12,263	17,790	68	217	165,024
	\$	182,376	372,116	941,696	692,224	242,518	236,597	4,601	4,506	2,676,634
1940.....	M	15,946	40,395	41,552	52,777	14,932	24,870	47	694	191,213
	\$	323,634	611,750	903,636	738,416	333,717	351,335	2,477	12,222	3,277,187
1941.....	M	14,288	30,664	52,419	69,750	15,621	25,449	38	644	208,871
	\$	285,260	455,385	1,218,632	1,043,832	363,908	386,097	2,100	10,279	3,765,493
1942.....	M	11,385	20,387	39,104	59,901	12,871	25,145	11	513	169,317
	\$	233,251	325,762	872,287	893,488	278,701	404,730	676	9,480	3,018,375
1943.....	M	9,260	14,195	34,623	51,000	10,504	15,681	3,190	225	138,678
	\$	206,826	209,508	867,630	829,365	256,362	243,446	191,424	4,203	2,808,764

Table 331.—Production of Building Brick in Canada—Per Capita of Population, for Years Specified

Year	M per capita	Year	M per capita
1905.....	0-087	1936.....	0-010
1914.....	0-070	1937.....	0-014
1929.....	0-046	1938.....	0-013
1930.....	0-031	1939.....	0-015
1932.....	0-010	1940.....	0-017
1933.....	0-006	1941.....	0-018
1934.....	0-008	1942.....	0-014
1935.....	0-009	1943.....	0-012

Table 332.—Production (Sales) of Building Brick (*) in Canada, by Provinces, 1941-1943

Province	1941		1942		1943	
	M	\$	M	\$	M	\$
Nova Scotia.....	5,402	84,394	7,086	129,679	6,411	108,963
New Brunswick.....	7,219	119,370	7,580	146,335	6,856	121,359
Quebec.....	78,700	1,384,875	61,300	1,067,253	52,428	976,370
Ontario.....	88,484	1,786,717	69,960	1,359,817	56,389	1,381,796
Manitoba.....	4,686	79,260	2,753	42,090	1,546	21,954
Saskatchewan.....	921	10,864	494	6,494	296	5,358
Alberta.....	15,441	152,827	13,991	145,379	12,026	130,534
British Columbia.....	8,018	147,186	6,153	121,328	2,726	62,430
Canada.....	208,871	3,765,493	169,317	3,018,375	138,678	2,808,764
Average value per M.....		\$18-00		\$17-83		\$20-25

(*) Includes fancy and sewer brick.

Table 333.—Production of Paving Brick in Canada, 1934-1943

Year	Quantity M	Value \$
1934.....	10	382
1935.....	15	627
1936.....	116	3,149
1937.....	3	131
1938.....	1	34
1939.....	157	6,089
1940.....	19	819
1941.....	120	7,312
1942.....	153	9,353
1943.....	151	8,967

Table 334.—Production of Structural Tile in Canada, 1934-1943

Year	Hollow Blocks(*)		Roofing Tile		Floor Tile (Quarries)	
	Short tons	\$	No.	\$	Sq. ft.	\$
1934.....	31,136	244,122	44,115	1,852	80,356	17,491
1935.....	(a) 47,195	344,608	82,015	3,669	51,765	7,629
1936.....	58,501	467,860	52,730	2,139	97,738	13,798
1937.....	64,526	533,843	60,542	3,302	73,191	12,169
1938.....	70,648	591,416	150,504	5,196	100,958	15,330
1939.....	86,120	714,291	148,291	4,964	90,812	15,233
1940.....	105,073	788,478	41,772	1,839	(b)	13,631
1941.....	117,530	1,063,120	(b)	750	(b)	21,349
1942.....	109,905	1,082,573	(b)	32	(b)	23,705
1943.....	84,460	819,635	(b)	827	(b)	26,949

(*) Including fireproofing and load-bearing tile.

(a) In addition, there was produced \$615 worth of ceramic tile.

(b) Data not available.

Table 335.—Production of Structural Tile in Canada, by Provinces, 1943

Province	Hollow Blocks (*)		Roofing Tile	Floor Tile (Quarries)
	Short tons	\$	\$	\$
Nova Scotia.....	11,875	124,687		
New Brunswick.....	1,610	15,536		
Quebec.....	25,378	261,874		
Ontario.....	35,980	333,256	744	26,864
Manitoba.....				
Saskatchewan.....	725	6,055		
Alberta.....	6,353	49,667		
British Columbia.....	2,548	28,460	83	85
Canada.....	84,469	819,535	827	26,949

(*) Including fireproofing and load-bearing tile.

Table 336.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1934-1943

Year	Value	Year	Value
	\$		\$
1934.....	436,433	1939.....	813,208
1935.....	481,559	1940.....	1,152,603
1936.....	588,485	1941.....	1,422,389
1937.....	790,210	1942.....	1,392,545
1938.....	778,107	1943.....	1,116,846

Table 337.—Production of Drain Tile in Canada, 1934-1943

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1934.....	7,385	180,553	1939.....	14,361	353,973
1935.....	7,124	205,336	1940.....	10,550	277,551
1936.....	8,148	214,549	1941.....	12,319	333,364
1937.....	11,391	298,970	1942.....	11,659	329,035
1938.....	12,862	322,774	1943.....	13,001	390,377

Table 338.—Production of Pottery† from Domestic Clays in Canada, 1934-1943

Year	Value	Year	Value
	\$		\$
1934.....	213,733	1939.....	*280,420
1935.....	220,711	1940.....	474,452
1936.....	218,402	1941.....	502,212
1937.....	232,209	1942.....	646,088
1938.....	235,890	1943.....	701,144

† Including coarse earthenware, stoneware flower pots, and all other pottery.

* In addition \$2,292 worth of sanitary ware was produced.

Table 339.—Production of Kaolin* and Fireclay in Canada, 1934-1943

Year	Kaolin		Fireclay		Year	Kaolin		Fireclay	
	Quantity	Value	Quantity	Value		Quantity	Value	Quantity	Value
	Tons	\$	Tons	\$		Tons	\$	Tons	\$
1934.....	48	504	1,043	12,598	1939.....			10,045	30,824
1935.....	170	1,520	2,272	15,574	1940.....			4,881	30,564
1936.....			2,437	17,639	1941.....	2	30	5,431	35,475
1937.....			4,123	26,081	1942.....	408	6,130	5,601	40,722
1938.....			2,344	17,243	1943.....	93	1,531	5,653	42,122

* Produced in the province of Quebec.

Table 340.—Production of Firebrick and Fireclay Blocks and Shapes in Canada, from Domestic Clays, 1934-1943

Year	Firebrick		Fireclay blocks and shapes	Year	Firebrick		Fireclay blocks and shapes
	Quantity	Value	Value		Quantity	Value	Value
	M	\$	\$		M	\$	\$
1934.....	2,100	101,219	62,388	1939.....	2,331	119,346	95,256
1935.....	1,817	90,149	71,344	1940.....	3,167	165,525	85,127
1936.....	2,538	118,923	65,171	1941.....	3,643	183,897	190,497
1937.....	2,950	142,827	75,431	1942.....	3,816	197,830	210,246
1938.....	2,213	113,581	73,512	1943.....	3,644	192,618	256,655

Table 341.—Production (Sales) of Bentonite in Canada, by Provinces, 1934-1943

Year	Bentonite							
	Manitoba		Alberta		British Columbia		Canada	
	tons	\$	tons	\$	tons	\$	tons	\$
1934.....					63	1,578	63	1,578
1935.....					41	731	41	781
1936.....					(a) 120	180	(a) 120	180
1937.....	132	1,154			31	817	163	1,971
1938.....			1,136	3,444	43	215	1,179	3,659
1939.....		591	889	2,850			988	3,441
1940.....	710	2,023	714	2,240	45	225	1,469	4,488
1941.....	760	1,330	1,317	5,882	95	618	2,172	7,830
1942.....		38,800		5,404			(b)	44,204
1943.....		110,428		5,262		1,357	(b)	117,047

(a) Partly for experimental purposes.

(b) Quantity not published.

Bentonite is a variety of clay derived from volcanic ash. Known commercial deposits in Canada are confined to the Prairie Provinces and British Columbia. All the clay is of the highly-colloidal or swelling variety.

In southern Manitoba, deposits have been under development for several years in the Morden area. In southern Saskatchewan numerous occurrences of bentonite exist in the Willowbunch-St. Victor-Eastend district, but so far there has been very little development there. Most of the production in Alberta has come from the Red Deer Valley region in the

vicinity of Drumheller. In southern British Columbia, bentonite occurs in beds of considerable thickness near Merritt and Princeton. Canada exports little or no bentonite. Substantial quantities of activated clay are imported from the United States for bleaching in oil refineries and for packing house products, and possibly also some ground natural bentonite for similar use.

The chief uses for bentonite are as a bonding ingredient in foundry sands; for the bleaching of mineral and vegetable oils and packing-house products; and to control the viscosity of oil-well drilling muds. In the United States, in 1942, 84 per cent of total bentonite sales went to these three major uses. For bleaching purposes, both natural and activated clay are employed.

In 1943, Wyoming dried and granulated clay continued to sell for \$7.50 per ton f.o.b. mines, in carload lots, and air-floated 200-mesh material for \$9.50, bagged. Special-grade, selected, air-floated clay was priced at \$26 per ton, f.o.b. Chicago. Freight rates from Wyoming points to Montreal are about \$14 per ton. Imported activated (Filtrol-type) bentonite has been costing \$75 to \$80 per ton, in carload lots, delivered eastern Canadian points, and American natural bleaching clay has sold for \$25 per ton laid down. Alberta oil-drilling bentonite sold in 1943 for \$40.75 per ton, f.o.b. Calgary plant, or \$42.75 delivered at Turner Valley, inclusive of 8 per cent sales tax. Effective January 1, 1944, the sales tax was cancelled, and 1944 prices have been reduced to \$38 and \$40, respectively.

Table 342.—Fuller's Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1934-1943

Year	Petroleum Products Industry		Soaps and Washing Compounds	
	Pounds (*)	\$	Pounds	\$
1934.....	18,588,514	230,357	508,316	6,562
1935.....	18,487,148	260,885	660,018	13,694
1936.....	18,907,295	243,164	1,328,219	20,601
1937.....	18,843,458	240,309	1,167,768	20,393
1938.....	19,687,467	281,668	1,195,208	19,575
1939.....	19,814,473	304,214	1,586,163	30,924
1940.....	23,828,660	406,185	1,651,471	40,695
1941.....	30,155,750	571,010	1,486,000	39,332
1942.....	24,162,091	528,350	1,350,000	37,831
1943.....	25,390,653	601,283	2,410,000	83,233

(*) Includes all clays.

Table 343.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1934-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	27,550	357,286	1939.....	32,769	420,092
1935.....	33,766	422,584	1940.....	36,931	558,659
1936.....	39,165	520,121	1941.....	32,844	588,585
1937.....	41,738	578,223	1942.....	28,734	578,190
1938.....	34,968	488,147	1943.....	26,874	561,285

Table 344.—Clays and Earths Used in Canadian Rubber Goods Industry, 1934-1943

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	2,391	54,368	1939.....	3,438	80,745
1935.....	2,639	63,553	1940.....	3,586	90,887
1936.....	3,017	70,709	1941.....	4,059	101,441
1937.....	3,614	79,300	1942.....	1,523	37,186
1938.....	2,942	81,935	1943.....	1,257	35,266

Table 345.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and Their Products in Canada, 1932-1943

Year	Firebrick		Fireclay		Other Fireclay, Firebrick and Cupola Blocks
	Number	Value	Tons	Value	
		\$		\$	\$
1932.....	3,409,000	123,532	5,910	52,492	36,395
1933.....	1,846,016	141,784	7,615	62,602	(b) 11,628
1934.....	2,590,452	192,538	8,248	75,906	21,488
1935.....	(a)	451,604	11,510	101,601	28,064
1936.....	(a)	(a)	(c) \$ 779,014	(a)	(a)
1937.....	(a)	(a)	(c) \$1,058,787	(a)	(a)
1938.....	(a)	(a)	(c) \$ 838,012	(a)	(a)
1939.....	(a)	(a)	(c) \$ 939,495	(a)	(a)
1940.....	(a)	(a)	(c) \$1,597,898	(a)	(a)
1941.....	(a)	(a)	(c) \$2,581,813	(a)	(a)
1942.....	(a)	(a)	(c) \$3,268,181	(a)	(a)
1943.....	(a)	(a)	(c) \$3,717,826	(a)	(a)

(a) Not published separately.

(b) From 1933 includes only cupola blocks.

(c) Combined value for firebrick, fireclay and other fireclay, etc.

Table 346.—Fuller's and Infusorial Earth Used in Specified Canadian Industries, 1933-1943

Year	Sugar Refineries		Vegetable Oil Mills	
	Pounds	\$	Pounds	\$
1933	(a)	(a)	126,880	2,730
1934	(a)	(a)	115,120	2,171
1935	(a)	(a)	88,980	2,425
1936	(b) 59,200	1,730	243,720	10,044
1937	(c) 4,586,786	95,532 (x)	212,997	9,349
1938	(c) 4,908,597	101,473	190,253	9,063
1939	(c) 4,819,811	105,711 (b)	207,105	10,166
1940	(c) 4,984,362	112,369 (b)	216,254	7,731
1941	(c) 5,333,131	133,129 (b)	275,290	10,604
1942	(c) 3,007,180	75,295 (b)	437,120	20,154
1943	(c) 3,451,142	89,075 (b)	484,380	20,302

(a) Not recorded.

(b) Fuller's earth, in 1942, includes 97,785 pounds clarex earth valued at \$4,657, and in 1943 it includes 164,130 pounds valued at \$7,836.

(c) Infusorial earth.

(x) Includes other earth.

Note.—In addition to the consumption recorded, there is a considerable quantity of fuller's earth used by the slaughtering industry.

Table 347.—Principal Statistics of the Domestic Clay Products Industry in Canada, 1942 and 1943

	1942	1943
Number of plants	124	105
Capital employed	\$ 17,793,931	17,162,747
Number of employees—On salary	281	248
On wages	2,242	1,925
Total	2,523	2,173
Salaries and wages—Salaries	\$ 590,545	570,300
Wages	\$ 2,482,406	2,339,541
Total	\$ 3,073,011	2,909,841
Selling value of products (gross)	\$ 7,081,723	6,608,193
Cost of fuel and purchased electricity	\$ 1,451,239	1,157,471
Cost of process supplies	\$ 188,806	104,336
Net value of sales	\$ 5,630,484	5,346,386

Table 348.—Capital Employed in the Domestic Clay Products Industry in Canada, by Provinces, 1943

Industry and province	Capital employed as represented by:					Total
	Present value of land†	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel, etc.	Inventory value of finished products on hand	Operating capital, including cash, bills and accounts receivable, etc.	
	\$	\$	\$	\$	\$	\$
By Industries—						
Brick and tile (*)—						
Nova Scotia.....	113,006	561,144	31,278	27,490	70,892	803,810
New Brunswick.....	19,568	160,862	2,931	5,800	23,761	212,922
Quebec.....	767,218	2,153,389	99,048	204,683	809,697	4,034,035
Ontario.....	1,157,979	4,121,036	104,312	259,239	2,162,005	7,804,571
Manitoba.....	14,000	14,500		3,100	60,000	91,600
Saskatchewan.....	227,840	384,911	29,103	33,228	117,779	792,861
Alberta.....	119,455	1,537,431	17,245	51,079	262,875	1,988,085
British Columbia.....	120,725	324,587	8,604	103,688	138,196	695,800
Total.....	2,539,791	9,257,860	292,521	688,307	3,645,205	16,423,684
Stoneware and pottery—						
Total.....	41,669	471,458	15,818	45,220	164,898	739,063
By Provinces—						
Total for clay and clay products—						
Nova Scotia.....	113,006	561,144	31,278	27,490	70,892	803,810
New Brunswick.....	26,760	174,317	7,149	8,402	35,721	252,349
Quebec.....	768,418	2,164,189	100,648	206,283	811,197	4,050,735
Ontario.....	1,170,479	4,141,036	105,112	264,988	2,177,705	7,859,320
Manitoba.....	14,000	14,500		3,100	60,000	91,600
Saskatchewan.....	227,840	384,911	29,103	33,228	117,779	792,861
Alberta.....	140,232	1,964,634	26,445	86,348	398,613	2,616,272
British Columbia.....	120,725	324,587	8,604	103,688	138,196	695,800
Total.....	2,581,460	9,729,318	308,339	733,527	3,810,103	17,162,747

(*) Clay, sewer pipe, firebrick products and other clays included under brick and tile.

(†) Excluding unmined material.

Table 349.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1943

Province	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
						\$	\$	\$
Nova Scotia.....	9	5	162		176	38,227	176,177	214,404
New Brunswick.....	6	3	64	22	95	11,450	69,858	81,308
Quebec.....	42	8	359	26	435	121,393	491,582	612,775
Ontario.....	77	27	610	3	717	241,340	807,741	1,049,081
Manitoba.....	9	1	55	2	67	20,180	59,923	80,103
Saskatchewan.....	12		36		48	23,091	57,751	80,842
Alberta.....	22	0	290	154	475	70,339	412,440	482,779
British Columbia.....	13	5	142		160	44,280	204,269	248,549
Canada.....	190	58	1,718	207	2,173	570,300	2,339,541	2,909,841
INDUSTRY								
Brick and tile.....	181	48	1,540	12	1,781	546,738	2,018,842	2,565,580
Stoneware and pottery.....	9	10	178	195	392	23,562	320,699	344,261
Canada.....	190	58	1,718	207	2,173	570,300	2,339,541	2,909,841

* See note page 31.

In 1913 there were 455 active firms in the Canadian domestic clay products industry; men employed numbered 11,193 and \$4,682,801 were distributed in salaries and wages. In 1918 the number of active firms was 230 and \$2,131,614 were paid in wages to 3,423 employees.

Table 350.—Average Number of Wage-Earners, by Months, 1940-1943

Month	1940	1941	1942	1943		
				Pit	Plant	
					Male	Female
January.....	1,190	1,907	1,966	72	1,437	183
February.....	1,051	1,792	1,811	72	1,404	187
March.....	1,287	1,871	1,829	79	1,433	196
April.....	1,739	2,427	2,106	94	1,449	207
May.....	2,647	3,250	2,382	138	1,565	195
June.....	3,143	3,369	2,570	179	1,685	208
July.....	3,191	3,281	2,588	170	1,782	215
August.....	3,027	3,070	2,560	168	1,789	212
September.....	2,812	2,869	2,389	143	1,745	213
October.....	2,530	2,628	2,326	128	1,672	221
November.....	2,300	2,424	2,218	117	1,566	226
December.....	2,151	2,153	1,920	103	1,502	225

II. PRODUCTS FROM IMPORTED CLAYS

This industry covers the operations of Canadian plants which were occupied chiefly in making ceramic products from imported clays. Products made in these plants during 1943 included high tension insulators, vitreous china sanitary ware, china dinnerware, firebrick, sewer pipe, floor and wall tile, refractory cements, electrical porcelains, etc.

Twenty-four plants reported in this group for 1943 and their output was valued at \$4,385,416, against last year's total of \$5,397,228 and the 1941 figure of \$5,371,853. Capital employed amounted to \$5,542,318. The average number of workers was 1,117 and payments for salaries and wages totalled \$1,768,361. Fuel and electricity cost \$332,902 and materials for use in manufacturing processes cost \$929,854.

Table 351.—Products Made in the Imported Clay Products Industry, 1942 and 1943

Product	1942	1943
	Gross selling value at works	Gross selling value at works
	\$	\$
Firebrick and stove linings—Rigid.....	1,138,761	608,482
Plastic.....	213,712	254,523
High temperature cements.....	131,478	112,737
High tension porcelain insulators, china sanitary ware, clay sewer pipe, floor and wall tile, pottery, china tableware, etc. (Separate figures cannot be shown for these items as there were only one or two producers in each case).....	3,913,277	3,409,674
Total.....	5,397,228	4,385,416

Table 352.—Materials Used in the Imported Clay Products Industry, 1942 and 1943

Material	1942		1943	
	Short tons	Total cost at works	Short tons	Total cost at works
		\$		\$
Imported clays—Ball clay.....	2,614	53,881	2,230	43,901
China clay.....	3,344	80,003	2,889	70,470
Fireclay.....	35,391	249,635	30,297	244,788
Saggar clay.....	847	14,347	812	13,828
Other imported clays.....	733	16,848	.....	18,991
Canadian clays—Fireclay.....	23	1,615	12	300
Other clays.....	164	836	18	54
Feldspar.....	2,799	62,525	2,352	50,794
Silica and ground quartz.....	3,753	63,250	3,597	58,412
Talc.....	565	7,774	354	5,586
Other glazing materials.....	.....	24,401	.....	18,277
Insulator hardware.....	.....	125,662	.....	75,316
Shipping containers and packing materials.....	.....	109,255	.....	94,424
All other materials.....	.....	360,897	.....	234,704
Total.....		1,170,938		929,854

PRICES (a)

Bentonite.—per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$7.50; pulverized, 200 mesh, \$9.50 in 100-lb. paper bags.

China Clay (Kaolin).—per ton, f.o.b. South Carolina and Georgia mines, in bulk; saggar clays, \$2.50 to \$3.50; tailings, \$4.50 to \$5.00. No. 2 grades, \$5.50 to \$6.00; No. 1 grades, air-floated, crude, \$6.75 to \$8.00; No. 1 washed, \$8.00. Florida: washed, crushed, bulk, \$11.75; air-floated and washed, \$14 to \$15. Maryland: ball clays, shredded bulk, \$3.00 to \$7.00; air-floated, in paper bags, \$10.10 to \$18.25. New Jersey: plastic kaolin, pulverized, in paper bags, \$10.25 to \$10.75. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, C and F. American ports: lump, \$26 to \$28 in bulk; air-floated \$40 to \$60 nominal.

Fuller's Earth.—per ton, f.o.b. Colorado, \$9; f.o.b. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up \$7.

(b)—**Fuller's Earth.**—English, long ton, nominal; Georgian, carlots, long ton \$27.78.

China Clay.—Imported, carlots, bulk, ton \$25 to \$50 (U.S. only). Pigment clay for rubber, carlots, bags, ton \$23.00 less carlots, ton, \$26.50. Kaolin, colloidal, lb. 10 cents, Osmo 14 cents a pound.

(a) "Engineering & Mining Journal's Metal & Mineral Markets"—New York, September, 1944 and July, 1943.

(b) F.O.B. market at Toronto—"Canadian Chemistry & Process Industries"—Toronto, July, 1944 and June, 1943.

Table 353.—Imports Into Canada and Exports of Clay and Clay Products, 1942 and 1943

	1942		1943	
	Quantity	\$	Quantity	\$
IMPORTS				
Building brick..... ton	1,400	17,603	1,192	17,403
Building blocks and fireproofing tile..... ton		13,574		22,354
Clays—China..... cwt.	924,886	528,580	674,008	392,651
Fire..... cwt.	1,926,652	369,845	1,668,888	320,809
Pipe..... cwt.	174,953	20,722	211,750	25,248
Other clays, n.o.p..... cwt.		154,963		186,842
Zirconium silicate..... ton		10,707		15,146
Zirconium oxide..... ton		37,523		41,745
Drain tile, unglazed..... ton		14		1,417
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed, n.o.p..... ton		6,164		2,958
Tiles or blocks of earthenware or stone prepared for mosaic flooring..... ton		31,231		23,680
Tiles, earthenware, for roofing purposes..... ton		149		254
Tiles, earthenware, n.o.p..... ton		82,558		56,638
Insulators, electric, porcelain..... ton		231,064		241,335
Pottery, chinaware and earthenware, n.o.p..... ton		4,926,563		4,371,530
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped: the dimensions of each not to exceed 125 cubic inches; for use exclusively in the construction or repair of a furnace, kiln, etc..... ton		117,940		70,129
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln or other equipment of a manufacturing establishment (not made in Canada)..... ton		2,195,994		1,972,956
Firebrick, n.o.p..... ton		1,717,146		1,661,129
Firebrick, chrome..... ton		317,894		256,993
Magnesite brick (fire)..... ton		1,175,015		1,111,754
Silica brick (containing not less than 90 per cent silica)..... ton		1,135,408		847,456
Paving brick..... ton		6,742	944	7,753
Artificial teeth, not mounted..... ton	786	752,096		768,425
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p..... ton		236,339		359,978
Saggars..... ton		33,240		46,778
Crucibles, clay or sand..... ton		78,583		21,799
Other manufactures of clay, n.o.p..... ton		340,952		259,667
Activated clay to refine oil..... ton		348,068		295,066
Grog for refractory materials..... ton	1,401	31,651	2,070	46,894
Total		14,918,338		13,446,817
EXPORTS				
Building brick..... M	1,435	25,159	1,711	30,305
Clay, manufactures of..... ton		106,475		221,104
Earthenware..... ton		27,763		31,181
Porcelain insulators..... ton		204,394		31,361
Refractories, dead-burned..... ton	1,880	50,845	8,610	94,578
Total		423,636		458,529

LIME INDUSTRY

Production of quick and hydrated lime in Canada during 1943 totalled 907,768 short tons valued at \$6,832,992 compared with 884,830 short tons worth \$6,530,839 in 1942. The 1943 output was the greatest ever recorded in the history of the Canadian lime industry and comprised 766,147 tons of quicklime valued at \$5,990,088 and 141,621 tons of hydrated lime at \$842,904. During the year under review, 730,499 short tons of quicklime valued at \$5,642,420 and 94,224 short tons of hydrated lime worth \$381,250 were sold or used, by producers, for chemical manufacture, while the balance of Canadian lime production was sold or used for building, agricultural and other purposes.

Stone used in the production of lime in Canada includes calcium, high calcium and dolomitic varieties of limestone. Included in the total figures of Canadian lime production is a considerable tonnage of lime recovered as a by-product in the manufacture of chemicals or allied products. It is estimated that approximately 1,614,481 tons of limestone were consumed in the production of lime in 1943. Lime was produced during 1943 in all Canadian provinces with the exception of Prince Edward Island and Saskatchewan; no commercial production of lime in the Northwest Territories has ever been officially reported. Of the total Canadian output of lime in 1943, Ontario plants produced 411,921 short tons or 45.5 per cent and Quebec 382,432 short tons or 42 per cent.

Imports of lime into Canada during 1943 totalled 9,077 short tons appraised at \$64,303 compared with 6,231 short tons at \$43,854 in 1942. Exports of lime from Canada in 1943 amounted to 15,391 short tons valued at \$133,320 as against 8,431 short tons worth \$74,517 in the preceding year.

During 1943 the lime industry, comprising 41 firms, reported 45 plants as active; capital employed totalled \$4,607,651, and \$1,408,393 were distributed to 898 employees. The cost of fuel and purchased electricity used amounted to \$1,747,012 and the value of explosives, chemicals, drill steel and other process supplies consumed aggregated \$177,470.

A report on lime for 1943, as prepared by the Bureau of Mines, Ottawa, states:

"The steadily increasing demand for lime by the war industries has raised production above all previous records. Most of the forty-five plants throughout the country operated at capacity during 1943, and in the early part of the year there was a serious shortage of high-calcium chemical lime in Eastern Canada. At Beachville, Ontario, which is one of the most important centres of chemical lime production in Canada, the diversion of the Thames River in the quarry area was begun in 1943, to make available much more rock for quarrying and to lessen the danger from floods.

"There are many prospective lime-producing localities in Canada because of the abundance of limestone throughout the country, but in the more industrialized areas, particularly in Ontario and Quebec, large unworked deposits of pure high-calcium limestone that will yield a white lime suitable for chemical purposes are becoming scarce. With the northward development of the mining industry considerable interest is being manifested in making lime from limestone deposits in the more northerly parts of the country.

"Lime is marketed in the form of quicklime and in the hydrated state, the latter being specially prepared slaked lime in the form of fine powder that is marketed in 50-pound, multi-wall paper bags. Quicklime is marketed in the lump, pebble, crushed, and pulverized forms, lump lime and pebble lime are sold either in bulk or packed in barrels; crushed lime (1-inch and under) and pulverized lime (ground to minus 20 mesh, and in some plants to minus 50 mesh) are sold in airtight, multi-wall paper bags. In these various forms lime finds a multitude of uses in chemical and metallurgical processes, in agriculture, in construction, and for various other purposes. It is one of the great basic raw materials of the chemical industry and well over 90 per cent of the present production is used in chemical processes.

"Prices of the various lime products vary over a wide range, depending on the geographical position of the plants and on difference in quality of the lime. No significant change occurred in prices of lime during 1943."

Table 354.—Production of Lime in Canada, by Provinces, 1943, Showing Purposes for Which Used (*) or Sold

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Total Canada
(1 ton = 2,000 pounds)						
QUICKLIME						
Building trades—						
Finishing lime.....ton			916	3,105		4,021
.....\$			8,245	27,559		35,804
Masons' lime.....ton	272	6,252	7,722	495		14,741
.....\$	2,992	90,418	70,562	5,863		169,835
Sand-lime brick.....ton	781	1,543	2,951			5,275
.....\$	7,810	7,332	25,455			40,597
Agriculture.....ton	34	77	217			328
.....\$	374	1,335	1,500			3,209
CHEMICAL—						
Smelters (non-ferrous).....ton		24,914	9,364	2,133	89	36,500
.....\$		160,844	70,653	17,114	649	249,260
Iron and steel furnaces (†).....ton	11,172	5,128	28,870	720	315	46,205
.....\$	128,658	46,757	208,198	5,750	2,298	391,661
Cyanide and flotation mills.....ton		1,870	14,049	7,858	462	24,239
.....\$		13,148	96,840	74,220	3,370	187,578
Pulp and paper mills.....ton	10,675	101,806	4,992	11,688	18,635	147,796
.....\$	101,451	742,021	34,275	88,444	166,115	1,132,306
Glass works.....ton			14,086	120		14,206
.....\$			101,315	1,319		102,634
Sugar refineries.....ton	167	5	3,385	13,249	50	16,856
.....\$	1,803	92	38,785	110,538	365	151,583
Tanneries.....ton	6	565	4,524			5,095
.....\$	65	4,441	31,858			36,364
Fertilizer plants.....ton		578	184			762
.....\$		3,951	1,351			5,302
Insecticide plants.....ton			1,099		564	1,663
.....\$			7,686		4,114	11,800
Other chemical works.....ton	138	139,080	290,015	2,067	5,877	437,177
.....\$	1,506	1,222,219	2,093,148	14,186	42,873	3,373,932
Uses unspecified.....ton		3,976	576	1,009	5,722	11,283
.....\$		38,735	4,200	13,546	41,742	95,223
Total Quicklime.....ton	23,245	285,794	382,950	42,444	31,714	766,147
.....\$	244,659	2,331,293	2,794,071	358,539	261,526	5,990,988
HYDRATED LIME						
Building trades—						
Finishing lime.....ton		517	14,847	5,350		20,714
.....\$		5,226	184,823	94,145		234,194
Masons' lime.....ton	223	5,565	6,426			12,214
.....\$	2,470	16,529	59,770			78,769
Sand-lime brick.....ton	27					27
.....\$	270					270
Agriculture.....ton	58	4,039	3,060		4,347	11,504
.....\$	650	13,873	29,612		30,129	74,264
CHEMICAL—						
Smelters (non-ferrous).....ton		79,500	1	25	355	79,881
.....\$		244,775	11	250	2,461	247,497
Iron and steel furnaces.....ton		12	86			98
.....\$		168	863			1,031
Cyanide and flotation mills.....ton		1,123	315	289	18	1,745
.....\$		3,475	3,308	2,890	125	9,798
Pulp and paper mills.....ton	3,405	3,518	675		45	7,643
.....\$	37,687	29,895	7,072		312	74,966
Sugar refineries.....ton	35	90				125
.....\$	390	877				1,267
Tanneries.....ton		180	620			800
.....\$		1,582	6,407			7,989
Fertilizer plants.....ton		13	692			705
.....\$		65	5,709			5,774
Insecticide plants.....ton	122	13			50	185
.....\$	1,586	65			347	1,998
Other chemical works.....ton		1,016	1,881	145		3,042
.....\$		9,817	19,663	1,450		30,930
Uses unspecified.....ton		1,052	368		1,518	2,938
.....\$		9,751	3,885		10,521	24,157
Total Hydrated Lime.....ton	3,870	96,638	28,971	5,809	6,333	141,621
.....\$	43,053	336,098	321,123	98,735	43,895	842,904
Grand Total.....ton	27,115	382,432	411,921	48,253	38,047	907,768
.....\$	287,712	2,667,391	3,115,194	457,274	305,421	6,832,992

(†) Includes calcined dolomite used as a refractory material.

(*) Not necessarily consumed in provinces where produced; includes by-product lime.

NOTE.—Of the total quantity of 907,768 tons of lime produced, 423,591 tons were consumed by the producers themselves.

Table 355.—Production of Lime in Canada, 1931-1943

Year	Sold or used (*)		Year	Sold	Used by producer	Total value
	Short tons	Value		Short tons	Short tons	
		\$				\$
1931.....	344,785	2,764,415	1939.....	288,252	263,957	4,003,514
1932.....	320,650	2,394,537	1940.....	359,180	357,550	5,194,555
1933.....	323,540	2,432,306	1941.....	451,361	409,524	6,357,941
1934.....	368,113	2,745,797	1942.....	470,882	413,948	6,530,839
1935.....	405,419	2,925,791	1943.....	484,177	423,591	6,832,992
1936.....	468,401	3,335,970				
1937.....	549,353	3,824,917				
1938.....	486,922	3,542,652				

(*) Separate data for Sold and Used not available until 1939.

Table 356.—Lime Sold or Used for Chemical and Other Purposes in Canada, 1934-1943

Year	Lime sold or used for chemical purposes				Lime sold or used for building or other non-chemical purposes			
	Quicklime		Hydrated Lime		Quicklime		Hydrated Lime	
	Short tons	\$	Short tons	\$	Short tons	\$	Short tons	\$
1934.....	201,609	1,440,221	28,297	158,685	106,513	798,035	31,694	348,856
1935.....	229,597	1,596,518	31,288	179,139	112,450	828,904	32,084	321,230
1936.....	349,940	2,490,074	39,384	171,192	41,559	290,898	37,518	374,806
1937.....	421,867	2,922,482	44,929	189,065	44,671	329,901	37,886	382,869
1938.....	373,278	2,587,329	30,547	159,598	42,483	365,762	40,614	429,963
1939.....	424,287	2,887,244	30,861	172,062	50,466	439,403	46,595	504,805
1940.....	568,479	3,944,748	44,421	256,570	55,324	477,010	48,506	516,227
1941.....	665,319	4,797,078	86,202	496,531	58,545	490,633	50,819	573,699
1942.....	712,307	5,314,653	89,252	386,809	36,975	331,396	46,296	497,981
1943.....	730,499	5,642,420	94,224	381,250	35,648	347,668	47,397	461,654

Table 357.—Principal Statistics of the Lime Industry in Canada, 1942 and 1943

	1942	1943
Number of firms.....	44	41
Number of plants.....	48	45
Capital employed..... \$	4,742,066	4,607,051
Number of employees—On salary.....	98	99
On wages.....	924	799
Total.....	1,022	898
Salaries and wages—Salaries..... \$	161,777	158,629
Wages..... \$	1,150,543	1,249,764
Total..... \$	1,312,320	1,408,393
Selling value of products (gross)..... \$	6,530,839	6,832,992
Cost of fuel and electricity..... \$	2,421,292	1,747,012
Process supplies used..... \$	177,268	177,470
Selling value of products (net)..... \$	3,932,279	4,908,510

Table 358.—Capital Employed in the Lime Industry in Canada, by Provinces, 1943

Province	Capital employed as represented by:					Total
	Present cash value of land	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of stone on hand, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash bills and accounts receivable, prepaid expenses, etc.)	
	\$	\$	\$	\$	\$	\$
New Brunswick (*)	25,387	120,853	9,536	3,972	42,293	202,041
Quebec	16,650	449,052	234,515	4,983	196,943	902,143
Ontario	91,466	1,735,557	302,032	8,035	25,736	2,162,826
Manitoba		487,949	30,808	3,913		522,670
Alberta	2,500	194,868	10,556	6,287	47,352	261,563
British Columbia	5,000	290,826	63,439	8,086	189,057	536,408
Canada	141,003	3,279,105	650,886	35,276	501,381	4,607,651

(*) Includes data for 2 firms in Nova Scotia.

Table 359.—Number of Firms, Employees, Salaries and Wages and Lime (Quick and Hydrated) Sold or Used, by Provinces, 1943

Province	Number of firms	Number of employees	Salaries and wages	Fuel electricity and process supplies used	Production	
					Tons of lime, sold or used	Value (gross)
			\$	\$		\$
1943						
New Brunswick (*)	5	102	152,150	89,035	27,115	287,712
Quebec	15	337	429,155	661,787	382,432	2,667,391
Ontario	11	241	435,158	890,323	411,921	3,115,194
Manitoba	4	84	110,071	139,908	30,038	307,819
Alberta	4	42	63,147	43,969	18,215	149,455
British Columbia	2	92	218,712	99,460	38,047	305,421
Canada	41	898	1,408,393	1,924,482	907,768	6,832,992

(*) Includes data relating to two firms in Nova Scotia.

Table 360.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1941-1943

Month	1941		1942		1943			
	Quarry	Kiln	Quarry	Kiln	Quarry		Kiln	
					Male	Female	Male	Female
January	300	605	285	628	322		518	1
February	319	630	297	619	309		500	1
March	343	656	314	647	275		503	
April	350	665	311	640	310		509	
May	375	668	318	643	281		525	
June	368	674	331	637	274		529	
July	379	705	327	633	266		517	
August	372	666	307	604	275		506	
September	375	680	299	537	260		513	2
October	373	674	261	631	261		599	2
November	365	659	271	614	261		538	2
December	333	631	272	590	245		505	2

SAND-LIME BRICK INDUSTRY

Four plants in Canada were engaged chiefly in making sand-lime building brick during 1943. Two of these were located in Ontario, 1 in Quebec and 1 in Manitoba. Production, including some cement blocks and brick, was valued at \$213,247 a decrease of 29.8 per cent from the 1942 total of \$303,762.

Capital invested in these works amounted to \$358,158. An average of 56 people were employed and they were paid \$84,313 in salaries and wages. Expenditures for fuel and electricity amounted to \$22,025 and for processing materials to \$66,673.

Production of sand-lime brick amounted to 9,088M valued at \$123,268, a decline in both quantity and value from the output of 12,472M brick at \$169,716 in the previous year. Production value of sand-lime building blocks dropped to \$22,365 from \$30,691.

Table 361.—Materials Used in Manufacturing, 1942 and 1943

Material	Unit of measure	1942		1943	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Portland cement.....	bbl.	7,949	17,295	4,482	8,678
Quicklime.....	ton	3,518	29,037	2,441	20,435
Sand and gravel.....	cu. yd.	36,206	35,756	18,990	26,955
Cinders.....	cu. yd.	4,964	4,080	6,000	4,500
Other materials.....			13,556		6,105
Total.....			99,274		66,673

Table 362.—Products Made, 1942 and 1943

		1942		1943	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Sand-lime brick.....	M	12,472	169,716	9,088	123,268
Sand-lime building blocks.....	M	213	30,691	139	22,365
Other products (*).....			103,355		67,614
Total.....			303,762		213,247

(*) Includes cement blocks, cinder blocks and insulating brick.

SAND AND GRAVEL INDUSTRY

Commercial production of sand and gravel in Canada during 1943 totalled 25,744,469 short tons valued at \$9,005,857 compared with 26,349,907 short tons worth \$9,005,414 in 1942. Included in the totals for both years are sands and gravels from various sources, including recoveries by dredges and material used by railroads as ballast and by mines as backfill.

Quebec and Ontario are Canada's largest sand and gravel producing provinces, the tonnage in these provinces in 1943 being, respectively, 10,601,376 and 8,285,309; in 1942, the quantity of material washed or screened at Canadian sand and gravel plants totalled 2,842,803 short tons as against 3,656,889 tons in 1942, and the quantity of bank or pit-run grades amounted to 22,901,666 short tons compared with a corresponding tonnage of 22,693,018 in the preceding year.

Of the total sand and gravel (mixed) output in 1943, there were 16,060,686 short tons used for concrete, roads, etc., and 3,837,111 short tons as railroad ballast. In addition, there were produced 1,970,316 short tons of straight-run sand for building, concrete, etc.; 42,656 tons for moulding; 1,335 short tons as core sand and 75,888 short tons for other purposes. The quantity of crushed gravel produced during the year under review amounted to 2,269,892 short tons. Sand used as mine fill in 1943 amounted to 1,486,585 short tons.

Firms (including individuals) reported as active in the Canadian sand and gravel industry numbered 1,387 in 1943; of these, 812 were located in Quebec, 517 in Ontario, 23 in British Columbia and lesser numbers in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta. Capital employed by the industry totalled \$3,674,501; employees were reported at 2,320; salaries and wages paid totalled \$2,683,257; fuel, electricity and process supplies used aggregated \$379,435 and the total net value of production was estimated at \$8,626,422.

Deposits of gravel and sand are numerous throughout Eastern Canada, with the exception of Prince Edward Island, where gravels are scarce. Owing to the widespread occurrence of gravels and sands and to their bulk in relation to value, local needs for these materials are usually supplied from the nearest deposits, as their cost to the consumer is governed largely

by the length of haul; hence the large number of small pits and the small number of large plants. Some grades of sand particularly suitable for certain industries command a much higher price than does ordinary sand.

Every province except New Brunswick and Prince Edward Island produces natural bonded moulding sand. One deposit in New Brunswick was operated in 1918 and another in 1921 and 1922. By far the greater part of the output has come from the Niagara Peninsula, Ontario. Occasionally new deposits have been opened up, mostly in Ontario and in the western provinces.

The results of a general investigation of moulding sands in Canada were published in 1936 by the Bureau of Mines, Ottawa, in Report No. 767, "Natural Bonded Moulding Sands of Canada". This report directs attention to the large number of deposits from which supplies have been obtained for local foundries and the possibility of replacing imported material with Canadian sands.

Canadian exports of sand and gravel totalled 382,319 short tons valued at \$212,503 in 1943 compared with 508,950 tons worth \$219,223 in 1942. Imports of sand and gravel in 1943 totalled 83,482 short tons valued at \$53,377 as against 132,452 tons worth \$89,974 in 1942.

Imports into Canada of silica sand for manufacturing totalled 509,043 short tons valued at \$1,011,117 in 1943 as against 540,904 tons worth \$1,011,476 in 1942.

Table 363.—Production in Canada of Sand and Gravel, 1942 and 1943

		Washed or screened	Bank or pit run	Total Value
		tons	tons	\$
PRODUCTION (*)— 1942				
Sand—				
Moulding sand.....		25,753	10,054	41,825
Building sand and sand for concrete, roadwork, etc.....		1,617,886	917,480	934,777
Core sand.....		2,454	240	3,670
Mine filling.....			836,757	147,602
Other sand (including blast sands, engine sands, etc.).....		2,727	51,302	12,534
Sand and Gravel—				
Sand and gravel for railway ballast.....		275,814	4,334,509	957,781
Sand and gravel for concrete, road-building, etc.....		1,342,011	14,797,848	6,010,412
Crushed gravel.....		390,244	1,744,828	89,813
Total.....		3,656,889	22,693,018	9,005,414
Cost of fuel, electricity and process supplies used.....				677,149
Total net value.....				8,328,265
PRODUCTION (*)— 1943				
Sand—				
Moulding sand.....		28,013	14,643	76,199
Building sand and sand for concrete, roadwork, etc.....		1,153,953	816,363	775,392
Core sand.....		1,335		2,032
Mine filling.....		118,838	1,367,747	270,863
Other sand (including blast sands, engine sands, etc.).....		4,959	70,929	15,577
Sand and Gravel—				
Sand and gravel for railway ballast.....		81,697	3,755,414	712,140
Sand and gravel for concrete, road-building, etc.....		1,247,057	14,813,629	6,155,625
Crushed gravel.....		206,951	2,062,941	998,029
Total.....		2,842,803	22,901,666	9,005,857
Cost of fuel, electricity and process supplies used.....				379,435
Total net value.....				8,626,422

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz in the bulletin "The Feldspar and Quartz Mining Industry".

Table 364.—Production (*) of Sand and Gravel in Canada, 1934-1943

Year	Tons	\$	Year	Tons	\$
1934.....	14,854,159	4,035,477	1939.....	31,294,341	11,241,102
1935.....	21,213,489	6,389,440	1940.....	31,375,415	11,759,245
1936.....	22,124,160	6,921,399	1941.....	31,604,806	10,375,723
1937.....	27,001,301	10,492,696	1942.....	26,349,907	9,005,414
1938.....	32,223,882	12,002,554	1943.....	25,744,469	9,005,857

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz. Also, does not include sand used for back filling at mines prior to 1936.

Table 365.—Production of Sand and gravel in Canada, by Railway Operators, 1942 and 1943

Kind	1942		1943	
	Tons	Value	Tons	Value
		\$		\$
Sand—				
Moulding sand.....	300	600	330	990
Building sand and sand for concrete, roads, etc.....	1,350	150	86,257	12,779
Other sand (including blast and engine sands).....	45,517	7,645	57,811	10,053
Sand and gravel—				
Sand and gravel for railway ballast.....	3,821,861	742,668	3,578,115	604,202
Sand and gravel for concrete, roads, etc.....	140,285	25,049	258,538	41,623
Crushed gravel.....	128,125	68,717	219,517	153,420
Total.....	4,137,438	844,829	4,200,568	823,067

Table 366.—Production of Sand and Gravel in Canada, by Operators, Other Than Railways, 1942 and 1943

Kind	1942			1943		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
	tons	tons	\$	tons	tons	\$
Sand—						
Moulding sand.....	25,753	9,754	41,225	28,013	14,313	75,209
Building sand and sand for concrete, roads, etc.....	1,617,886	916,130	934,627	1,153,953	730,106	762,613
Core sand.....	2,454	240	3,670	1,335	.....	2,032
Other sand (including blast and engine sands).....	2,727	5,785	4,889	4,959	13,118	5,524
Sand and gravel—						
Sand and gravel for railway ballast.....	275,814	512,648	215,113	81,697	177,299	107,938
Sand and gravel for concrete, roads, etc.....	1,342,011	14,657,563	5,985,363	1,247,057	14,555,091	6,114,002
Mine filling.....	.....	836,757	147,602	118,838	1,397,747	270,863
Crushed gravel.....	390,244	1,616,703	828,096	206,951	1,843,424	844,609
Total.....	3,656,889	18,555,589	8,160,585	2,842,803	18,701,098	8,182,790

Table 367.—Production of Sand and Gravel in Canada, by Provinces, 1943

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Sand—								
Moulding sand..... tons	1,219	.....	.....	40,082	863	20	.....	472
..... \$	4,571	.....	.....	69,935	1,385	45	.....	263
Building sand and sand for concrete, roadwork, etc..... tons	84,232	.....	935,680	811,043	22,490	1,018	9,685	106,168
..... \$	12,479	.....	274,246	432,404	10,161	87	13,572	32,443
Core sand..... tons	.....	.....	.....	1,335	.....	.....	.....	.....
..... \$	.....	.....	.....	2,032	.....	.....	.....	.....
Other sand (including blast sand, engine sand, etc.)..... tons	.....	.....	1,754	17,109	.....	48,021	8,275	729
..... \$	.....	.....	426	4,631	.....	8,545	1,867	108
Sand and gravel—								
Sand and gravel for railway ballast..... tons	134,887	228,190	1,140,313	1,235,220	263,879	456,684	152,107	225,831
..... \$	20,640	36,722	214,545	214,656	44,229	71,348	21,593	83,407
Sand and gravel for concrete, roads, etc..... tons	518,568	460,439	6,700,039	5,141,510	761,441	781,621	456,090	1,240,978
..... \$	420,815	313,026	1,194,112	2,616,766	238,163	503,416	272,357	596,970
Mine filling..... tons	.....	.....	.....	893,441	.....	899	.....	592,245
..... \$	.....	.....	.....	174,103	.....	246	.....	96,514
Crushed gravel..... tons	178,470	30,902	1,823,590	145,569	.....	.....	.....	91,361
..... \$	126,502	23,188	679,306	106,325	.....	.....	.....	62,708
Total..... tons	917,376	719,531	10,601,376	8,285,309	1,048,673	1,288,263	626,157	2,357,784
Gross value..... \$	585,007	372,936	2,362,635	3,620,832	293,938	583,687	309,389	877,413

Table 368.—Production of Washed and Screened and Pit Run Grades, 1943

Province	Washed or screened	Bank or pit run	Total Value
	tons	tons	\$
Nova Scotia.....	33,973	883,403	585,007
New Brunswick.....		719,531	372,936
Quebec.....	391,297	10,210,079	2,362,635
Ontario.....	1,652,094	6,633,215	3,620,852
Manitoba.....	113,008	935,665	293,935
Saskatchewan.....		1,288,263	583,687
Alberta.....	54,499	571,658	309,389
British Columbia.....	597,932	1,659,852	877,413
Total.....	2,842,803	22,901,666	9,005,857

Table 369.—Production of Sand for Building and Concrete, Roads, etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, etc., 1934-1943

Year	Sand		Sand and Gravel			
	For building, concrete, roads, etc. (*)		For railway ballast		For concrete, roads, etc.	
	tons	\$	tons	\$	tons	\$
1934.....	686,631	209,002	1,454,618	266,292	12,418,408	3,411,751
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937.....	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764
1938.....	1,750,187	685,976	2,359,703	443,936	22,513,256	9,101,882
1939.....	1,169,899	364,829	3,223,718	603,288	22,899,751	8,988,114
1940.....	1,961,604	537,937	3,834,904	699,518	21,465,961	9,100,612
1941.....	2,192,405	729,901	4,836,908	916,979	19,769,798	7,135,258
1942.....	2,535,366	934,777	4,610,323	957,781	16,139,859	6,010,412
1943—						
Nova Scotia.....	84,232	12,479	134,887	20,640	518,568	420,815
New Brunswick.....			228,190	36,722	460,439	313,026
Quebec.....	935,680	274,246	1,140,313	214,545	6,700,039	1,194,112
Ontario.....	811,043	432,404	1,235,220	214,656	5,141,510	2,616,766
Manitoba.....	22,490	10,161	263,879	44,229	761,441	238,163
Saskatchewan.....	1,018	87	456,684	71,348	781,621	503,416
Alberta.....	9,685	13,572	152,107	21,593	456,090	272,357
British Columbia.....	106,168	32,443	225,831	88,407	1,240,978	596,970
Canada.....	1,970,316	775,392	3,837,111	712,140	16,060,686	6,155,625

(*) Exclusive of engine and other sands and mine fill.

Table 370.—Principal Statistics of the Sand and Gravel Industry in Canada (*), 1941-1943

	1941	1942	1943
Number of firms.....	1,399	1,419	1,387
Capital employed..... \$	4,287,789	4,477,547	3,674,501
Number of employees—On salary.....	109	113	89
On wages.....	3,143	2,028	2,231
Total.....	3,252	2,141	2,320
Salaries and wages—Salaries..... \$	214,840	224,868	182,034
Wages..... \$	2,780,686	2,179,887	2,501,223
Total.....	2,995,526	2,404,755	2,683,257
Selling value of sand and gravel produced by railway companies (Gross)..... \$	821,789	844,829	823,067
Selling value of sand and gravel produced by other operators (Gross)..... \$	9,553,934	8,160,685	8,182,790
Total Selling Value of Sand and Gravel Produced (Gross).....	10,375,723	9,005,514	9,005,857
Cost of fuel and electricity..... \$	389,643	509,190	322,202
Cost of process supplies used..... \$	85,004	167,959	57,233
Total net value of production.....	9,901,076	8,328,265	8,626,422

(*) Includes data relating to sand production by dredgers and railways.

Table 371.—Capital Employed, Number of Employees, Salaries and Wages Paid, and Fuel and Electricity Consumed, by Provinces, 1943

Province	Number of operators	Capital employed (*)	Number of employees	Salaries and wages	Cost of fuel and electricity used	Cost of process supplies used	Net value of production
1943		\$		\$	\$	\$	\$
Nova Scotia.....	5	(*)	614	552,647	(*)	(*)	585,007
New Brunswick.....	4	5,000	138	119,670	(*)	(*)	372,936
Quebec.....	812	250,077	781	810,722	34,153	11,889	2,316,588
Ontario.....	517	1,260,097	336	469,591	221,425	14,638	3,334,789
Manitoba.....	10	543,568	187	291,308	10,733	15,099	268,106
Saskatchewan.....	10	113,692	36	68,238	811	12,212	570,664
Alberta.....	6	53,071	84	143,576	11,388	1,572	296,429
British Columbia.....	23	1,443,996	144	227,505	43,687	1,823	831,903

(*) Complete data not available.

Table 372.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces 1943

Province	Average number of employees			Salaries and wages		
	Salaried Employees	Wage-earners	Total	Salaries	Wages	Total
				\$	\$	\$
Nova Scotia.....	1	613	614	250	552,397	552,647
New Brunswick.....		138	138		119,670	119,670
Quebec.....	14	767	781	13,287	797,435	810,722
Ontario.....	26	310	336	53,089	418,502	469,591
Manitoba.....	16	171	187	40,088	251,220	291,308
Saskatchewan.....	1	35	36	100	68,138	68,238
Alberta.....	5	79	84	24,485	119,091	143,576
British Columbia.....	26	118	144	50,735	176,770	227,505
Canada.....	*89	12,231	2,320	182,034	2,501,223	2,683,257

* Includes 12 females.

† Includes 4 females.

Table 373.—Average Number of Wage-Earners, by Months, 1939-1943

Month	1939	1940	1941	1942	(*) 1943
January.....	203	274	450	369	333
February.....	245	268	440	434	358
March.....	340	346	517	524	367
April.....	821	629	815	782	665
May.....	11,054	3,275	4,400	3,796	3,310
June.....	13,444	8,182	8,493	5,352	5,156
July.....	13,591	11,504	8,023	4,787	5,753
August.....	12,451	11,526	7,225	3,183	4,247
September.....	10,253	8,644	3,421	1,835	2,870
October.....	5,199	3,372	2,570	1,142	2,095
November.....	1,032	886	764	954	714
December.....	382	628	412	528	480

(*) Average for year 2,227 males and 4 females.

THE STONE INDUSTRY IN CANADA

The Stone Industry in Canada comprises two main divisions: 1. The Stone Quarrying Industry, including quarries and dressing works operated in conjunction with quarries, and 2. The Stone Products Industry, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under mining, while statistics of the Stone Products industry are included under manufactures. For convenience, this report carries data for both of these industries.

These two major divisions, constituting the Canadian stone industry, represented a capital investment of \$14,300,581 in 1943. Production during the year totalled \$10,402,844, which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1943 numbered 3,330 and their combined earnings amounted to \$4,786,170.

The two industries are treated separately in the following review:

1. PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

The gross value of all varieties of stone produced in Canada during 1943 totalled \$7,964,179 compared with \$8,746,594 in 1942. The tonnage shipped in 1943 included 6,265,181 tons of limestone valued at \$6,105,749; 780,422 tons of granite (igneous rocks) valued at \$1,522,072; 164,163 tons of sandstone valued at \$250,603; 11,848 tons of marble valued at \$68,022, and 1,336 tons of slate worth \$17,733. Of the total value of domestic stone produced in 1943, quarries in the province of Quebec contributed 50.2 per cent, Ontario 37.1 per cent, and Nova Scotia 5.3 per cent.

The number of firms in the stone quarrying industry in 1943 totalled 407; capital employed amounted to \$10,954,939; employees numbered 2,473; salaries and wages paid aggregated \$3,529,755, and the cost of fuel, electricity and process supplies used was reported at \$1,533,627.

Table 374.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1942 and 1943

Province		Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1942							
Nova Scotia.....	tons	429	185,232		43,856		229,517
	\$	41,985	645,680		76,502		764,167
New Brunswick.....	tons	964	82,623		4,350		87,937
	\$	29,334	281,296		10,650		321,280
Quebec.....	tons	1,178,765	2,926,964	9,429	72,894	158	4,188,210
	\$	1,449,840	2,565,029	58,714	92,724	158	4,166,465
Ontario.....	tons	90,530	2,992,885	4,295	18,835		3,106,545
	\$	288,828	2,636,431	27,675	33,004		2,985,938
Manitoba.....	tons	133	43,355				43,488
	\$	2,452	69,514				71,966
Alberta.....	tons		12,028				12,028
	\$		40,436				40,436
British Columbia.....	tons	95,604	199,496	100	13,930	1,211	310,341
	\$	133,810	230,139	1,820	13,930	16,643	396,342
Canada.....	tons	1,366,425	6,442,583	13,824	153,865	1,369	7,978,066
	\$	1,946,249	6,468,525	88,209	226,810	16,801	8,746,594
1943							
Nova Scotia.....	tons	703	174,933		72,232		247,863
	\$	28,407	264,197		128,265		420,869
New Brunswick.....	tons	1,522	51,406		655		53,583
	\$	15,856	128,915		2,600		147,371
Quebec.....	tons	634,920	2,709,320	7,596	75,298	191	3,427,325
	\$	1,164,463	2,696,205	41,720	94,388	191	3,996,967
Ontario.....	tons	79,582	3,114,460	4,167	7,818		3,206,027
	\$	212,136	2,704,205	24,852	17,190		2,958,383
Manitoba.....	tons		37,974				37,974
	\$		50,784				50,784
Alberta.....	tons		13,961				13,961
	\$		47,899				47,899
British Columbia.....	tons	63,695	163,127	85	8,160	1,145	236,212
	\$	101,210	213,544	1,450	8,160	17,542	341,906
Canada.....	tons	780,422	6,265,181	11,848	164,163	1,336	7,222,950
	\$	1,522,072	6,105,749	68,022	250,603	17,733	7,964,179

(a) All igneous rocks included.

(b) Includes dolomite, also marl for agricultural purposes.

NOTE.—Not included in the above limestone statistics are 2,155,750 tons of limestone consumed in the cement industry in 1942 and 1,918,742 tons in 1943. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 1,574,508 tons of limestone were burned in the manufacture of lime in 1942 and 1,614,481 tons in 1943.

Table 375.—Production (Sales) of Stone from Canadian Quarries, by Provinces, Showing Purposes for Which Used, 1943 (*)

For use as follows:	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
1943								
Building stone—Rough.....	tons 660	116	3,718	2,397			1,636	8,527
	\$ 4,445	1,506	10,509	8,307			1,727	26,494
Dressed.....	tons 235	235	7,329	956	40			8,560
	\$ 4,607	255,329	25,983	2,015				287,934
Monumental and ornamental stone—Rough.....	tons 48	286	5,668	150			1,158	7,310
	\$ 747	9,686	92,330	1,882			12,090	116,735
Dressed.....	tons 275	3,180	50	130			2,290	3,925
	\$ 27,000	322,259	1,050	4,700			42,519	397,528
Flagstone.....	tons 30		2,167	45				2,242
	\$ 700		4,903	275				5,878
Curbstones.....	tons 327							327
	\$ 2,364							2,364
Paving blocks.....	tons 800							800
	\$ 7,014							7,014
Lining open-hearth furnaces.....	tons 5,463			14,783				20,246
	\$ 9,560			11,087				20,647
Chemical—								
Flux in iron and steel furnaces.....	tons 123,728	6	1,743	420,797	4,921	1,210	2,032	554,437
	\$ 148,475	13	1,481	340,358	8,255	3,030	3,589	505,201
Flux in non-ferrous smelters.....	tons 132,670		111,617				38,830	283,117
	\$ 71,150		82,618				23,666	177,434
Glass factories.....	tons 319					3,838		4,157
	\$ 1,580					5,757		7,337
Pulp and paper mills.....	tons 2,846	4,270	129,480	30,299	1,365		47,122	215,382
	\$ 14,246	7,902	176,139	86,521	1,502		88,570	374,880
Sugar refineries.....	tons 11,180							11,180
	\$ 9,503							9,503
Other chemical uses.....	tons 244,697			239,229			16,256	260,953
	\$ 16,543							255,772
Pulverized Stone—								
Whiting (substitute).....	tons 2,715						190	2,905
	\$ 15,480						2,280	17,760
Asphalt filler.....	tons 196		17,359	3,486			1,703	22,744
	\$ 1,764		61,314	12,825			9,157	85,060
Dusting coal mines.....	tons 5,271					2,552		368
	\$ 6,325					10,208	2,484	19,017
Agricultural purposes and fertilizer plants.....	tons 34,616	46,678	154,465	28,665	2,379	2,285	1,948	271,036
	\$ 81,014	120,911	246,804	63,558	5,946	9,140	5,844	533,217
Other uses.....	tons 140		7,272	3,413	42		90	10,957
	\$ 763		24,313	2,963	168		1,160	29,367
Crushed stone for manufacture of artificial stone.....	tons 116		121					237
	\$ 542		524					1,066
Roofing granules.....	tons 7,239						873	8,112
	\$ 97,266						15,284	112,550
Poultry grit.....	tons 3,622		9,094	130	4,034			18,207
	\$ 20,324		52,427	1,040	19,596		6,710	100,097
Stucco dash.....	tons 662		319	35			448	1,464
	\$ 4,296		962	155			4,333	9,746
Terrazzo chips.....	tons 642		850					1,492
	\$ 3,206		5,000					8,206
Rock wool.....	tons 13,237							13,237
	\$ 12,660							12,660
Rubble and riprap.....	tons 2,760	1,962	355,586	121,905	4,500		53,914	540,627
	\$ 4,837	2,046	238,865	128,546	4,900		39,731	418,925
Crushed stone—								
Concrete aggregate.....	tons 57,006		1,428,719	492,797	2,000		700	1,981,222
	\$ 64,267		1,253,110	408,182	1,700		630	1,727,889
Road metal.....	tons 14,999		735,721	1,282,288	16,255		59,167	2,108,428
	\$ 58,189		848,229	1,010,752	14,910		57,429	1,989,509
Railroad ballast.....	tons 445,059		396,948	2,761			8,160	852,928
	\$ 379,359		314,447	2,423			8,160	704,389
Total Canada.....	tons 247,868	53,583	3,427,325	3,206,027	37,971	13,961	236,212	7,222,950
	\$ 420,869	147,371	3,996,967	2,958,383	50,784	47,899	341,806	7,961,179
Per cent of total								
Quantity	3.43	0.74	47.45	44.39	0.52	0.19	3.28	100.00
Value	5.28	1.85	50.19	37.15	0.64	0.60	4.29	100.00

(*) Includes the production of slate and marl.

Table 376.—Production (Sales) of Stone from Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1942 and 1943

For use as follows:	Granite (a)	Lime- stone (b)	Marble	Sand- stone	Slate	Total
1942						
Building stone—Rough.....	tons 2,354	11,818	214	1,298		15,684
	\$ 12,540	25,250	10,692	7,034		55,516
Dressed.....	tons 2,497	6,230	146	340		9,213
	\$ 108,807	169,382	19,476	8,600		366,265
Monumental and ornamental stone—						
Rough.....	tons 6,858		53			6,911
	\$ 99,011		1,349			100,360
Dressed.....	tons 3,827	218				4,045
	\$ 356,459	4,513				360,972
Flagstone.....	tons	223		1,042		1,265
	\$	1,276		5,363		6,639
Curbstone.....	tons 5,571					5,571
	\$ 28,781					28,781
Paving blocks.....	tons 2,008			25		2,033
	\$ 12,776			280		13,056
Lining open-hearth furnaces.....	tons	20,311				20,311
	\$	15,238				15,238
Chemical—						
Flux in iron and steel furnaces.....	tons	581,373				581,373
	\$	920,241				920,241
Flux in non-ferrous smelters.....	tons	178,037				178,037
	\$	123,042				123,042
Glass factories.....	tons	3,358	1,177			4,535
	\$	4,197	5,483			9,680
Manufacture of magnesium.....	tons	5,267				5,267
	\$	3,051				3,051
Pulp and paper mills.....	tons	207,994				207,994
	\$	330,933				330,933
Sugar refineries.....	tons	19,956				19,956
	\$	21,527				21,527
Other chemical uses.....	tons	236,812	1	7,336		244,149
	\$	237,681	5	8,873		246,559
Pulverized Stone—						
Whiting (substitute).....	tons	3,942				3,942
	\$	23,682				23,682
Asphalt filler.....	tons	13,494			51	13,545
	\$	56,205			408	56,613
Dusting coal mines.....	tons	1,698				1,698
	\$	7,757				7,757
Agricultural purposes and fertilizer plants.....	tons	285,924	20		240	286,184
	\$	639,182	98		1,920	641,200
Other uses.....	tons	9,570	250			9,820
	\$	25,960	1,370			27,330
Crushed stone for manufacture of artificial stone.....	tons	239	127			366
	\$	952	618			1,570
Roofing granules.....	tons	35,204	310		840	36,354
	\$	181,352	1,240		13,461	196,053
Poultry grit.....	tons	3	5,326	3,445		8,801
	\$	70	26,433	19,782		46,609
Stucco dash.....	tons	6	814	953		1,826
	\$	80	8,445	6,953		16,008
Terrazzo chips.....	tons		443	2,513		2,956
	\$		1,329	16,866		18,195
Rock wool.....	tons		9,942			9,942
	\$		9,799			9,799
Rubble and riprap.....	tons	83,986	289,188	4,925	34,201	412,528
	\$	51,201	234,940	5,517	38,458	330,274
Crushed Stone—						
Concrete aggregate.....	tons 1,051,168	1,818,625		54,944		2,924,737
	\$ 897,444	1,444,013		82,900		2,424,357
Road metal.....	tons 171,228	2,063,819		40,659		2,275,706
	\$ 196,102	1,619,999		61,372		1,877,473
Railroad ballst.....	tons 1,735	667,652		13,830		683,317
	\$ 1,626	512,258		13,830		537,814
Total Canada (b).....	tons 1,366,425	6,442,583	13,824	153,365	1,369	7,978,066
	\$ 1,946,249	6,468,525	88,209	226,810	16,801	8,746,594

Table 376.—Production (Sales) of Stone from Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1942 and 1943—Concluded

For use as follows:	Granite (a)	Lime- stone (b)	Marble	Sand- stone	Slate	Total
1943						
Building stone—Rough.....	tons 1,754	4,014	79	2,680		8,527
	\$ 3,497	7,859	4,427	10,711		26,494
Dressed.....	tons 3,148	5,314	73	25		8,560
	\$ 103,691	172,198	10,745	1,300		287,934
Monumental and ornamental stone—						
Rough.....	tons 7,310					7,310
	\$ 116,735					116,735
Dressed.....	tons 3,795	130				3,925
	\$ 392,828	4,700				397,528
Flagstone.....	tons 1,185	1,185		1,057		2,242
	\$ 1,185	1,185		4,693		5,878
Curbstone.....	tons 327					327
	\$ 2,364					2,364
Paving blocks.....	tons 800					800
	\$ 7,014					7,014
Lining open-hearth furnaces.....	tons 20,246	20,246				20,246
	\$ 20,647	20,647				20,647
Chemical—						
Flux in iron and steel furnaces.....	tons 554,422	15				554,437
	\$ 504,951	250				505,201
Flux in non-ferrous smelters.....	tons 283,117					283,117
	\$ 177,434					177,434
Glass factories.....	tons 3,928	229				4,157
	\$ 6,094	1,243				7,337
Pulp and paper mills.....	tons 215,382					215,382
	\$ 374,880					374,880
Sugar refineries.....	tons 11,180					11,180
	\$ 9,503					9,503
Other chemical uses.....	tons 260,953					260,953
	\$ 255,772					255,772
Pulverized Stone—						
Whiting (substitute).....	tons 2,905					2,905
	\$ 17,760					17,760
Asphalt filler.....	tons 22,530				214	22,744
	\$ 83,348				1,712	85,060
Dusting coal mines.....	tons 8,191					8,191
	\$ 19,017					19,017
Agricultural purposes and fertilizer plants.....	tons 271,036					271,036
	\$ 533,217					533,217
Other uses.....	tons 10,467	490				10,957
	\$ 26,504	2,863				29,367
Crushed stone for manufacture of artificial stone.....	tons 121	116				237
	\$ 524	542				1,066
Roofing granules.....	tons 6,921	320			871	8,112
	\$ 96,920	400			15,230	112,550
Poultry grit.....	tons 3	12,996	5,208			18,207
	\$ 74	68,502	31,521			100,097
Stucco dash.....	tons 5	717	682		60	1,464
	\$ 66	4,384	4,698		600	9,746
Terrazzo chips.....	tons 148	1,344				1,492
	\$ 444	7,762				8,206
Rock wool.....	tons 13,237					13,237
	\$ 12,660					12,660
Rubble and riprap.....	tons 181,096	298,968	3,612	56,780	191	540,637
	\$ 105,644	244,821	3,973	64,296	191	418,925
Crushed Stone—						
Concrete aggregate.....	tons 308,341	1,604,224		68,657		1,981,222
	\$ 258,078	1,386,337		83,474		1,727,889
Road metal.....	tons 290,830	1,820,774		26,824		2,108,428
	\$ 430,592	1,480,948		77,969		1,989,509
Railroad ballast.....	tons 6,092	838,676		8,160		852,928
	\$ 4,569	691,660		8,160		794,389
Total Canada (b).....	tons 780,422	6,265,181	11,848	161,163	1,336	7,222,950
	\$ 1,522,072	6,105,749	65,022	250,603	17,733	7,964,179

(a) Includes all igneous rock.

(b) Does not include limestone used in Canadian lime and cement industries but includes marl used for agricultural purposes.

GRANITE

Table 377.—Production of Granite (*) in Canada, 1934-1943

Year	Short tons	\$	Year	Short tons	\$
1934.....	200,285	781,739	1939.....	1,102,395	2,119,501
1935.....	326,354	1,126,287	1940.....	1,147,747	1,884,410
1936.....	941,743	1,319,313	1941.....	600,922	1,498,786
1937.....	1,135,099	1,827,433	1942.....	1,366,425	1,946,249
1938.....	705,307	1,379,417	1943.....	780,422	1,522,072

(*) Includes all igneous rock.

The following abstracts are from a report on granite prepared by the Bureau of Mines, Ottawa:

"The stone quarried consists of granite and related crystalline igneous rocks used for building, decorative, ornamental, or constructional purposes. Producing properties are situated in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia. Large areas in Canada are underlain by granite and the prospects of finding stone suitable for its various uses are good.

"Granite for monumental use is produced in the Maritime Provinces and in Quebec, Ontario, Manitoba, and British Columbia. Early in 1939 an appreciable amount of foreign stone, principally of the black and red varieties, was imported, mainly from Finland and Sweden. Black granite has been quarried in Canada, notably in the vicinity of Lake St. John, Quebec, and from quarries along the north shore of Lake Superior, and stone from these areas should find a ready market for monumental use. Other deposits of 'black granite' in the Maritime Provinces, Quebec, Ontario, and Manitoba show promise of yielding stone of good quality.

"Much of the granite produced in Canada is used for foundations for highways; for the permanent ballasting of railway roadbeds; for heavy aggregate in large concrete structures; for the filling of breakwaters; and for bridge piers. Granite from quarries in Quebec has been used in the construction of public buildings in different parts of Canada, in competition with local stone. Most operations in which granite is used have been greatly curtailed during the war.

"Some granite is being imported from the United States for monumental use, but Canadian granite is being used to an increasing extent for this purpose. Stone for monumental use which has enjoyed a steady market for a number of years may later be completely superseded by another variety. At present the so-called 'black granite' and the 'grey' varieties seem to be in most demand for monuments, although the various shades of reds are still popular in many districts.

"Canadian producers would be well advised to give careful study to the market possibilities of a monumental stock, especially for the black and red varieties.

"In the building trade, coloured granites are being used to an increasing extent in the form of thin polished slabs for trim for buildings in which the main colour scheme calls for contrast. Canadian granites are suitable for all the purposes for which granite is used, and with persistent advertising there is no reason why this industry should not have a flourishing future."

LIMESTONE

Table 378.—Production of Limestone (*) in Canada, 1934-1943

Year	Short tons	\$	Year	Short tons	\$
1934.....	3,747,779	3,157,832	1939.....	4,149,589	3,817,551
1935.....	3,631,665	3,253,573	1940.....	6,108,591	5,126,075
1936.....	3,731,548	3,143,872	1941.....	7,151,049	6,057,727
1937.....	5,542,806	4,673,942	1942.....	6,442,583	6,468,525
1938.....	4,288,507	3,894,619	1943.....	6,265,181	6,105,749

(*) Includes dolomite and marl; production of marl totalled 23,026 tons in 1942 and 22,913 tons in 1943.

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Limestone is the most widely used of all rocks because of the great variety and importance of its industrial uses and because of its widespread occurrence. It is quarried in all provinces of Canada except Prince Edward Island and Saskatchewan, but by far the greater part of the production comes from Ontario and Quebec. The 1943 production of limestone for all purposes, including the manufacture of lime and cement, constituted about 90 per cent of the total production of Canadian stone.

"Limestone is available in great bedded formations and in massive highly metamorphosed deposits, the former being much more common and yielding most of the production. At present almost all Canadian limestone is won by open pit methods, though underground mining of the rock has been adopted by several companies producing limestone for chemical and metallurgical uses and for making lime. Underground mining will undoubtedly become more common particularly for the production of high-grade stone for chemical purposes, as the readily accessible parts of deposits become worked out.

"For industrial use limestone is marketed in a variety of forms ranging from huge squared blocks of dimension stone used in construction, to extremely fine dust used chiefly as a mineral filler. Some of the products are processed little if at all from the condition in which the rock is obtained from the quarry (as, for example, limestone used in the wood pulp industry), but the bulk of the output is crushed and screened for use as road metal, concrete aggregate, railroad ballast, and as flux in metallurgical plants. Large quantities are used in the manufacture of Portland cement, lime, and various chemical products.

"The great bulk of limestone used in chemical and metallurgical industries is of the high-calcium variety, but dolomite is rapidly increasing in importance as an industrial raw material. Argillaceous dolomite is used for the manufacture of rock-wool, a widely used insulating material. Pure dolomite is now an important source of magnesia and magnesium metal.

"A use for limestone that is capable of enormous development is in agriculture. Though the necessity of applying limestone or lime to agricultural land in order to maintain or increase soil fertility has been emphasized for many years by authorities on agriculture, the quantity so used in Canada is still very small, whereas if the proper quantity were applied it would constitute one of the principal outlets for limestone.

"Limestone in blocks of large dimensions for sawing into building stone is quarried in Quebec, Ontario, and Manitoba. In Quebec, quarries at St. Marc des Carrières, Portneuf county, produce grey limestone, and several in and near Montreal yield limestone of similar colour. In Ontario, two quarries near Queenston in the Niagara Peninsula yield silver-grey limestone as well as small quantities of buff and of variegated buff and grey. At Longford Mills, near Orillia, buff, silver-grey, and brown limestone for use as marble and as building stone is available, but has not been quarried for the past several years. The Manitoba quarries are near Tyndall and yield mottled buff, mottled grey, and mottled variegated limestone. Besides these large quarries, the products of which have a wide shipping range, small quarries producing building stone for local use are worked near Quebec City, Montreal, and Hull in Quebec; and at Ottawa, Kingston, and Warton in Ontario. Rubble is their chief product.

"Some of the quarry companies market stone in all stages of manufacture, from the mill block to elaborately carved material; others sell stone only in the mill block. Waste material is utilized for crushed stone, rubble, riprap, flagging, chemical and metallurgical purposes, and for lime manufacture.

"Prices of limestone in the mill block f.o.b. quarry have remained almost stationary in recent years, and range from 50 cents to \$1 a cubic foot, depending on the size of block and grade of stone."

MARBLE

Table 379.—Production of Marble in Canada, 1934-1943

Year	Short tons	\$	Year	Short tons	\$
1934.....	13,783	69,475	1939.....	14,124	200,054
1935.....	15,975	85,369	1940.....	13,739	75,409
1936.....	22,866	169,698	1941.....	17,649	126,081
1937.....	21,642	88,595	1942.....	13,824	88,209
1938.....	19,375	87,274	1943.....	11,848	68,022

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Marble quarries are operated in Quebec, Ontario, Manitoba, and British Columbia. The products include squared blocks for sawing into slabs and for making monuments, and broken marble for rubble and for making terrazzo, stucco dash, whiting substitute, poultry grit, marble flour, and artificial stone. Waste from some of the quarries is sold for chemical uses and for road metal.

"In Quebec, several varieties of clouded grey marble and also a black marble are quarried at Phillipsburg by Missisquoi Stone and Marble Company, Limited. Some brown marble used for counters and wainscoting is obtained from the building stone quarries in the Trenton limestone at St. Marc des Carrières, Portneuf county. Dolomitic white marble is quarried and crushed by White Grit Company at Portage du Fort, Pontiac county, and by Canada Marble and Lime Company at L'Annonciation, Labelle county, for the making of terrazzo chips, stucco dash, poultry grit, artificial stone, and for chemical and ceramic uses. A small quantity of dark red marble has been quarried at Cap St. Martin near Montreal, chiefly for making tombstones.

"In Ontario, black marble in beds up to 40 inches thick is quarried at St. Albert, near Ottawa, by Silvertone Black Quarries Limited. White marble is quarried at Marmora by Bonter Marble and Calcium Company, Limited, and at Haliburton by Bolender Brothers for making terrazzo chips, poultry grit, stucco dash, and artificial stone. Buff, red, white, green, and black marbles are quarried north of Madoc by Karl Stocklosar and by Connolly Marble, Mosaic and Tile Company, Limited for use as terrazzo.

"In Manitoba, a number of highly coloured marbles are available, but there is only a small production to supply terrazzo chips and building rubble.

"In British Columbia there are many deposits of marble, but there is only a small production of white marble from near Victoria and from Texada Island for use as terrazzo, poultry grit, marble sand, and whiting substitute.

"Many known deposits of beautifully coloured marbles have never been fully investigated, chiefly because the present demand in Canada for marble of any one colour, other than for a staple variety, such as white, is comparatively small.

"The war has adversely affected the Canadian marble industry, for in 1943 most of the buildings erected were of the industrial type in which little or no standing marble was used. Few of the quarries were in active operation and such shipments as were made of block or slab marble were from stock. Some of the operators have recently taken on as a side line the production of terrazzo and poultry grit from waste marble. Most of the terrazzo previously originated in Europe but now a good range of colours is available in domestic material. Colours that are still in short supply are deep reds and some shades of yellow.

"There is a wide range in the price of marble depending on quality and rareness of colouring."

SANDSTONE

Table 380.—Production of Sandstone in Canada, 1934-1943

Year	Short tons	\$	Year	Short tons	\$
1934.....	115,169	143,283	1939.....	176,265	331,830
1935.....	342,824	838,005	1940.....	176,475	805,543
1936.....	285,508	495,856	1941.....	169,885	305,528
1937.....	235,165	343,871	1942.....	153,865	236,810
1938.....	101,854	218,405	1943.....	164,163	250,603

Canadian sandstone has been utilized extensively in the construction of many important public buildings in Canada and is finding increasing favour as a material in the construction of the better type home. The rock occurs in Canada in a variety of colours, including white, reddish brown, yellow and grey. Shipments of sandstone were made in 1943 from quarries located in all of the provinces with the exception of Prince Edward Island, Manitoba, Saskatchewan and Alberta.

The greater part of the crude output in 1943 was employed as rubble and riprap and in the crushed state for concrete, highway construction and railroad ballasting. Sandstone in British Columbia, New Brunswick and Nova Scotia has been employed in the manufacture of abrasive wheels and sharpening stones; such production is included with natural abrasives manufacture. Crude, crushed or ground quartzite sold for fluxing purposes or as silica sand is included under quartz as production.

SLATE

Table 381.—Production of Slate in Canada, 1934-1943

Year	Short tons	\$	Year	Short tons	\$
1934.....	738	4,802	1939.....	1,149	6,760
1935.....	1,129	4,329	1940.....	1,113	7,522
1936.....	1,247	5,414	1941.....	1,296	12,562
1937.....	900	5,519	1942.....	1,369	16,801
1938.....	979	6,311	1943.....	1,336	17,733

Canadian slate production in 1943 came entirely from the provinces of Quebec and British Columbia and represented shipments of the stone in the form of granules for roofing purposes, riprap and asphalt filling. No Canadian deposits of slate suitable for the production of high grade roofing slates or shingles have been reported as being under development in recent years.

Table 382.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1934-1943

Year	Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture (c)
1934.....	52,665 tons	489,580	821,099	2,062,487	345,802	806,546
	\$ 490,095	447,429	608,240	1,668,927	209,296	
1935.....	200,899 tons	537,799	804,719	1,976,363	351,302	818,443
	\$ 1,258,741	483,709	523,847	1,987,351	211,993	
1936.....	42,335 tons	615,207	1,014,145	1,903,927	784,081	1,180,358
	\$ 714,616	553,597	730,617	1,653,134	659,656	
1937.....	49,098 tons	693,947	1,497,655	3,169,136	642,243	1,465,168
	\$ 746,370	626,297	1,214,181	2,522,080	570,606	
1938.....	49,666 tons	551,737	981,739	2,721,922	86,019	1,338,689
	\$ 725,402	468,000	791,971	2,347,010	58,816	
1939.....	71,288 tons	577,278	1,344,636	2,131,306	600,266	1,407,099
	\$ 1,344,340	523,579	1,109,028	1,773,337	522,832	
1940.....	97,336 tons	725,685	2,673,078	2,300,613	896,403	1,784,291
	\$ 722,514	681,796	2,171,487	1,855,744	741,772	
1941.....	54,262 tons	965,690	2,581,583	2,958,613	446,505	2,113,618
	\$ 653,077	889,574	1,986,226	2,484,393	322,348	
1942.....	24,897 tons	1,236,044	2,924,737	2,275,706	683,317	2,186,248
	\$ 361,781	1,651,982	2,424,357	1,877,473	527,814	
1943.....	17,087 tons	1,329,226	1,981,222	2,108,428	852,928	1,994,202
	\$ 314,428	1,330,127	1,727,889	1,989,509	704,389	

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry.

(c) Includes shale 1937-1943. (Includes 13,821 tons slate in 1938; 27,241 tons in 1939; 18,347 tons in 1940; 26,837 tons in 1941; 30,498 tons in 1942 and 75,460 tons in 1943).

WHITING SUBSTITUTE

(Bureau of Mines, Ottawa)

Whiting substitute, as the name implies, is a material that may be used in place of chalk whiting, all of which originates in England or in continental Europe. It may be made from white limestone or white marble, marl, lime, or the waste calcium carbonate sludge resulting from the manufacture of caustic soda.

The products made from white marble or white limestone are pulverized to various degrees of fineness ranging from 200 to 400 mesh, and the raw material used contains very little magnesium carbonate, though in the past a whiting substitute made from white dolomite was produced in Eastern Canada for making putty.

The principal differences between whiting made from chalk and whiting substitute made from marble or limestone are that the latter is usually whiter, has a low capacity for absorbing oil, and the individual particles are subangular rather than rounded. Most of the whiting substitute made in Canada is made from white marble.

Marl suitable for making whiting substitute should be white or nearly so, be nearly free from grit and clayey material, and have a very low content of organic matter. This last-named constituent, which is present to some extent in all deposits of marl, renders the product unsuitable for use as a filler in products such as putty and paint where it will come in contact with oils. The oil-absorptive capacity of whiting substitute made from marl is usually greater than that of whiting, but in other respects the physical characteristics of the two products are much the same. Two plants have been built to make whiting substitute from marl, but only one was in operation in 1943. The output of that plant was utilized entirely as a filler for newsprint.

By-product precipitated chalk, made from waste sludge resulting from the manufacture of caustic soda from soda ash and lime, is classed as a whiting substitute, but its usefulness is restricted by the fact that it almost invariably contains a small amount of free alkali. The raw materials for the manufacture of by-product precipitated chalk are available, but it is not yet being made in Canada.

Producers of whiting substitute are: Pulverized Products, Limited, Montreal; Claxton Manufacturing Company, Toronto; White Valley Chemicals, Limited, Toronto; Marlhill Mines, Limited, Marlbank, Ontario; Gypsum, Lime and Alabastine, Canada, Limited, Winnipeg; and Beale Quarries, Limited, Van Anda, Texada Island, British Columbia.

No separate record is kept of production of whiting substitute, but it is known that the industry has experienced a steady growth in recent years because improvements in grinding equipment and the maintenance of close technical control have enabled products to be marketed that are very consistent in chemical and physical properties. Many manufacturers now use the domestic products with entire satisfaction in place of imported whiting, and with all European sources of whiting cut off because of the war the domestic industry is largely supplying the Canadian market.

Whiting substitute made in Canada is used mostly in the manufacture of oilcloth, linoleum, in certain kinds of rubber products, in putty, in explosives, and as a filler in newsprint, book, and magazine paper. In lesser quantities it is used in the manufacture of moulded articles, cleaning compounds and polishes, as a ceramic glaze, and for a number of other purposes.

Prices per ton, bagged and in carload lots, range from \$8 to \$15 a ton f.o.b. plants.

Table 383.—Consumption of Whiting, (and Chalk), by Uses, as Reported to the Annual Census of Industry, 1942 and 1943

Industry	1942		1943	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Paints and pigments.....	8,274	241,646	7,773	239,832
Rubber.....	4,495	83,129	3,202	58,215
Miscellaneous textiles*.....	4,575	50,254	4,147	45,342
Explosives (a).....	436	10,454	271	4,472
Toilet preparations (a).....	115	10,991	238	18,985

* Includes oilcloth and linoleum.

(a) Chalk, ground and precipitated.

Table 384.—Imports into Canada and Exports of Stone, by Kinds, 1942 and 1943

	1942		1943	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS—				
Curling stones and handles therefor.....pair	380	8,069	392	8,784
Flagstone, sandstone, and all building stone, not hammered, sawn or chiselled.....ton	800	6,135	422	1,651
Flagstone and building stone, other than marble or granite, sawn on not more than two sides.....ton	318	2,975	432	4,000
Granite, rough, not hammered or chiselled.....		44,022		47,291
Granite, sawn only.....		17,488		16,450
Granite, monuments.....		609		
Granite, manufactures of, n.o.p.....		2,129		5,828
Marble, rough, not hammered or chiselled.....		4,440		5,462
Marble, sawn or sand rubbed, not polished.....		8,951		10,282
Marble, not further manufactured than sawn for tombstones.....		15,091		25,971
Marble, manufactures of, n.o.p.....		5,476		8,915
Refuse stone.....ton	633,088	349,776	807,561	447,850
Slate roofing.....square	454	4,338	460	5,229
Slate pencils and school writing slates.....		7,838		7,843
Slate mantels and manufactures of slate, n.o.p.....		26,679		29,666
Chalk, china, cornwall or cliff stone and mica schist.....		16,800		33,404
Mineral wool.....ton	807	54,776		72,780
Whiting, gilders' whiting and Paris white.....ton	11,889	255,414	11,198	257,496
Manufactures of stone, n.o.p.....		22,913		18,346
Lithographic stones not engraved.....		464		467
Chalk, prepared.....		12,321		12,290
Pumice and pumice stone and lava tufa.....		28,919		19,479
Grindstones, not mounted and not less than 36 inches in diameter.....No.	1,100	97,981	612	64,731
Grindstones, n.o.p.....No.	594	2,967	1,068	2,266
Burrstones, rough, in blocks.....No.	70	2,747	36	452
Ganister.....ton	949	8,865	484	3,970
Total.....		1,008,189		1,110,903
EXPORTS—				
Crushed stone.....ton	608	617	1,173	999
Granite and marble, unwrought.....ton	3,245	47,155	3,762	47,258
Dressed stone of all kinds.....		14,433		7,819
Grindstones, manufactured.....		4,546		5,032
Total.....		66,751		61,108

Table 385.—Employees, Salaries and Wages, Specified Costs and Net Values, in the Stone Industry in Canada, by Provinces, 1943

Province	Firms	Average number of employees			Salaries and wages		Cost of fuel, electricity and process supplies used	Net value of production
		Salaried employees		Wage-earners	Salaries	Wages		
		No.	Male	Female	\$	\$		
Nova Scotia.....	36	6	1	130	16,922	162,721	26,614	394,255
New Brunswick.....	7		2	14	2,188	8,366	1,550	145,821
Quebec.....	161	168	45	1,344	240,604	1,811,313	874,671	3,122,296
Ontario.....	179	60	18	515	193,258	837,153	599,887	2,359,496
Manitoba.....	5	4	1	13	9,519	12,578	6,510	44,274
Alberta.....	2	(a)	(a)	(a)	(a)	(a)	(a)	47,899
British Columbia.....	17	14	1	137	22,499	212,634	24,395	317,511
Canada.....	407	252	68	2,153	484,990	3,044,765	1,533,627	6,430,552

(a) Data not available.

Table 386.—Capital Employed in the Stone Quarrying Industry of Canada, by Provinces, 1943

	Plants	Capital employed as represented by:					Total
		Present cash value of the land*	Present value of buildings, fixtures, machinery, tools and other equipment	Inventory value of materials on hand, stocks in process, fuel and miscellaneous supplies on hand	Inventory value of finished products on hand	Operating capital (cash, bills and accounts receivable, prepaid expenses, etc.)	
	No.	\$	\$	\$	\$	\$	\$
Nova Scotia.....	40	20,691	69,947	30,000	2,500	19,910	143,048
New Brunswick.....	7	31,131	33,680	494	.....	12,667	77,972
Quebec.....	170	1,131,475	3,105,357	315,743	232,268	922,663	5,707,506
Ontario.....	183	1,499,776	2,076,447	108,517	120,840	679,395	4,484,975
Manitoba.....	6	44,590	79,558	186	.....	.....	124,334
Alberta.....	2	(a)	(a)	(a)	(a)	(a)	(a)
British Columbia.....	45	139,495	165,364	7,908	13,646	90,691	417,104
Canada.....	453	2,867,158	5,530,353	462,848	369,254	1,725,326	10,954,939

* Excluding unmined materials.

(a) Not available.

Table 387.—Average Number of Wage-Earners, by Months, 1942 and 1943

Month	1942 Total	1943			
		Quarry			Dressing works
		Surface		Under- ground	Male
		Male	Female	Male	
January.....	1,462	1,282	3	.....	261
February.....	1,349	1,358	3	.....	299
March.....	1,732	1,405	3	.....	289
April.....	2,348	1,632	3	.....	320
May.....	2,862	2,053	4	.....	340
June.....	2,999	2,111	4	.....	355
July.....	2,987	2,202	4	.....	285
August.....	2,977	2,231	4	.....	318
September.....	2,958	2,284	16	.....	299
October.....	2,736	2,201	4	.....	319
November.....	2,448	1,942	4	.....	315
December.....	1,867	1,336	4	.....	260
Average.....	2,415	1,859	6	.....	288

2. SECONDARY PRODUCTION

THE STONE PRODUCTS INDUSTRY

In 1943 there were 151 stone dressing works whose operations were reported separately from the quarries. These plants were engaged chiefly in cutting or polishing Canadian or imported stone to produce finished monuments or cut and dressed stone for construction purposes. Retail establishments engaged only in selling and lettering monuments have not been included. Five producers of rock wool were also included in this industry.

Output from this industry was valued at \$4,098,100 in 1943, an increase of 4 per cent over the total of \$3,939,764 reported for the previous year. The 60 works in Ontario accounted for 59.2 per cent of the total output and the 41 plants in Quebec for 21.9 per cent. The average number of employees was 857 and \$1,256,415 were paid in salaries and wages. Materials used in the cutting and dressing processes, including stone, cost \$1,521,308 and expenditures for fuel and electricity amounted to \$138,127.

Table 388.—Cost of Materials Used in the Stone Products Industry, 1942 and 1943

	Cost at Works	
	1942	1943
	\$	\$
Stone—(a) From Canadian quarries.....	387,605	344,413
(b) Imported.....	193,808	178,572
Monuments, cut and polished, for lettering only.....	102,052	87,106
All other materials.....	759,922	911,217
Total.....	1,423,387	1,521,308

Table 389.—Production from the Stone Products Industry, by Provinces, 1942 and 1943

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For building purposes	Monu-ments	For building purposes		Monu-ments and bases	For building purposes			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island and New Brunswick—										
1942.....	82,551		11,084			1,500		2,440	1,115	98,690
1943.....	96,202		20,470					2,310	1,015	119,997
Nova Scotia—										
1942.....	38,894	1,770	17,276			1,334		32,034	4,676	95,984
1943.....	48,510		21,530					31,499	2,148	103,687
Quebec—										
1942.....	401,774	57,548	8,807	54,429	1,880	4,590	1,000	6,106	319,287	855,421
1943.....	451,938	23,473	7,656	39,150	5,264	2,425	420	15,770	353,556	899,652
Ontario—										
1942.....	840,207	37,132	92,301	75,426	7,678	3,400	101,038	78,789	1,211,518	2,447,489
1943.....	751,272	400	102,773	41,966	1,511	15,221	32,805	75,976	1,406,531	2,428,455
Manitoba—										
1942.....	52,475		17,386		165	5,482		31,314	8,599	115,421
1943.....	55,788	14,495	18,699	7,360	23,289	2,075	1,402	7,785	1,850	132,743
Saskatchewan—										
1942.....	47,973		37,918		1,415	6,629	350	5,875	7,991	108,151
1943.....	66,164		44,344		1,654	7,215	1,394	8,375	17,381	146,527
Albena—										
1942.....	61,087	25,000	10,117	5,000	21,230	500		4,329	1,329	128,592
1943.....	65,556	27,500	9,607	5,500	23,000	600			6,592	138,355
British Columbia—										
1942.....	77,893		2,300	4,254				1,160	4,409	90,016
1943.....	66,326		2,210	2,654				10,950	46,544	128,684
Canada—										
1942.....	1,602,854	121,450	197,189	139,109	32,368	23,435	102,388	162,047	1,558,924	3,939,764
1943.....	1,601,756	65,868	227,289	96,630	51,718	27,536	36,021	152,665	1,845,617	4,098,100

Table 390.—Production in Canada and Imports of Rock Wool, 1934-1943

Year	Production \$	Imports	
		Pounds	\$
1934.....	1,709	2,987,611	69,267
1935.....	66,459	1,922,938	57,877
1936.....	265,472	2,391,504	101,592
1937.....	346,460	2,080,144	81,050
1938.....	396,261	1,337,954	45,109
1939.....	525,998	1,820,763	44,860
1940.....	955,229	2,082,589	52,233
1941.....	1,185,324	2,633,544	74,791
1942.....	1,417,258	1,613,914	54,776
1943.....	1,707,501	1,839,670	72,780

CONTRACT DRILLING IN THE CANADIAN MINING INDUSTRY, 1944

Section 1

Diamond Drilling of Deposits Other Than Fuels

There were 34 firms engaged in contract diamond drilling of Canadian mineral deposits, other than fuels, during 1944 compared with 27 in 1943. The income received from drilling operations completed by these firms in 1944 totalled \$4,970,247 against \$3,072,481 in the preceding year. The average number of employees in 1944 was reported at 1,468 and the amount of salaries and wages distributed totalled \$2,461,813. The footage drilled by contractors in 1944, in the entire Dominion, aggregated 3,468,797 feet, of which approximately 39 per cent was completed in Ontario, 38 per cent in Quebec and 16 per cent in British Columbia. Contract diamond drilling was also conducted in Nova Scotia, Manitoba, Saskatchewan, Alberta and the Northwest Territories. Firms engaged in this type of drilling purchased in 1944 borts, ballas, carbons, readyset bits, etc., amounting in value to \$810,085 compared with \$637,070 in 1943.

Not included in this report are general statistics relating to diamond drilling conducted by Canadian mining companies with their own personnel and equipment; employment data relating to such operations are combined with those pertaining to the Canadian mining industry proper.

**Drilling Operations Conducted by Contractors Who Employed Diamond Drills Only
and Which Were Confined Chiefly to the Testing of Metalliferous Deposits**

Table 391.—Contract Diamond Drilling Operations in Canada, 1943 and 1944

Province	Footage drilled	Income from drilling	Average number of employees	Total salaries and wages paid
1943		\$		\$
Nova Scotia.....	957	1,795	5	1,664
New Brunswick.....				
Quebec.....	852,801	827,742	231	413,453
Ontario.....	1,417,935	1,763,124	508	820,591
Manitoba.....	35,844	43,357	18	23,561
Saskatchewan.....	34,860	40,951	15	20,140
Alberta.....	7,078	34,497	14	13,757
British Columbia.....	286,331	344,064	101	194,439
Yukon.....				
Northwest Territories.....	13,902	16,951	4	6,339
Canada.....	2,649,708	3,072,481	896	1,493,944

Value of stones, readyset and castset bits purchased by contractors, 1943..... \$637,070

Province	Footage drilled	Income from drilling	Average number of employees	Total salaries and wages paid
1944		\$		\$
Nova Scotia.....	2,802	4,660	4	2,539
New Brunswick.....				
Quebec.....	1,310,156	1,985,927	634	969,082
Ontario.....	1,348,813	2,031,096	680	1,042,491
Manitoba.....	69,006	115,319	38	42,989
Saskatchewan.....	47,926	55,962	24	26,361
Alberta.....	32,922	128,329	25	54,498
British Columbia.....	544,077	392,961	102	220,746
Yukon.....				
Northwest Territories.....	113,095	255,993	61	103,107
Canada.....	3,468,797	4,970,247	1,568	2,461,813

Value of stones, readyset and castset bits purchased by contractors, 1944..... \$810,085

Equipment owned by these contractors in 1944 included 240 air or steam-operated drills, 334 gas-driven drills and 3 electric drills.

Table 392.—Drilling Completed on Auriferous Quartz Deposits (Gold Mines) in Canada, 1943 and 1944

	Footage Drilled	
	1943	1944
DIAMOND DRILLING FOR EXPLORATION AND TESTING—		
By mining companies with their own personnel and equipment.....	543,062	510,262
By diamond drilling contractors (*).....	1,321,727	1,606,20
OTHER DIAMOND DRILLING—		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment.....	97,298	83,672
By diamond drilling contractors (*).....	591,598	444,859
Drilling by percussion or other machines (†).....	20,014,708	17,830,270

(*) Included in Table 391.

(†) Not complete as records are unavailable at certain mines.

The value of diamonds purchased by gold mining companies in 1944 totalled \$128,115.

Table 393.—Drilling Completed on Copper-Gold-Silver and Nickel-Copper Deposits in Canada, 1943 and 1944

	Footage Drilled	
	1943	1944
DIAMOND DRILLING FOR EXPLORATION AND TESTING—		
By mining companies with their own personnel and equipment.....	109,703	99,691
By diamond drilling contractors (*).....	283,028	285,386
OTHER DIAMOND DRILLING—		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment.....	1,197,437	1,088,602
By diamond drilling contractors (*).....	32,042	139,552
Drilling by percussion or other machines (†).....	16,300,824	12,731,871

(*) Included in Table 391.

(†) Not complete as records are unavailable at certain mines.

Value of diamonds purchased by copper-gold-silver and nickel-copper mining companies in 1944 totalled \$180,388.

Table 394.—Drilling Completed on Silver-Lead-Zinc and Silver-Cobalt Deposits in Canada, 1943 and 1944

	Footage Drilled	
	1943	1944
DIAMOND DRILLING FOR EXPLORATION AND TESTING—		
By mining companies with their own personnel and equipment.....	7,319	7,353
By diamond drilling contractors (*).....	64,425	86,466
OTHER DIAMOND DRILLING—		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment.....		
By diamond drilling contractors (*).....	96,963	280,447
Drilling by percussion or other machines (†).....	1,871,957	2,660,574

(*) Included in Table 391.

(†) Not complete as records are unavailable at certain mines.

Table 395.—Drilling Completed on Other Metal-Bearing Deposits, 1943 and 1944

	Footage Drilled (b)	
	1943	1944
DIAMOND DRILLING FOR EXPLORATION AND TESTING—		
By mining companies with their own personnel and equipment.....	32,694	30,864
By diamond drilling contractors (*).....	280,645	41,976
OTHER DIAMOND DRILLING—		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment.....	(a)	(a)
By diamond drilling contractors (*).....	(a)	(a)
Drilling by percussion or other machines.....	(a)	(a) 356,697

(*) Included in Table 391.

(a) Not reported, or not complete as records are unavailable at certain mines.

(b) Includes drilling on iron, chromite, molybdenite and mercury deposits; exclusive of drilling on pitchblende deposits.

Diamonds purchased in 1944 by companies mining these minerals were valued at \$268.

Table 396.—Drilling Completed on Asbestos Deposits, 1944

	Footage Drilled
DIAMOND DRILLING FOR EXPLORATION AND TESTING—	
By mining companies with their own personnel and equipment.....	37,111
By diamond drilling contractors (*).....	22,019
OTHER DIAMOND DRILLING—	
Blast hole diamond drilling:	
By mining companies with their own personnel and equipment.....	
By diamond drilling contractors.....	
Drilling by percussion or other machines.....	(†) 3,414,969

(*) Included in Table 391.

(†) Not complete as data are not reported by some firms.

Diamonds purchased by asbestos mining companies in 1944 cost \$5,756.

NOTE.—The total footage of contract drilling recorded in Tables 392, 393, 394, 395 and 396 does not necessarily agree with the corresponding totals shown in Table 391 as drilling data are incomplete or unobtainable from some mining firms.

DIRECTORY 1944

The data shown in Table 391 were compiled from returns made by the following firms:

Name of Firm	Head Office Address
Allard Bros.....	Val d'Or, Que.
Anderson, Anton.....	20 Patricia Blvd., Timmins, Ont.
Arno Diamond Drilling Co. Ltd.....	164 Pine St. N., Timmins, Ont.
Baderski, Frank and Son.....	Schumacher Road, Timmins, Ont.
Boyles Bros. Drilling Co. Ltd.....	1291 Parker St., Vancouver, B.C.
Boyles Bros. Drilling (Eastern) Ltd.....	1291 Parker St., Vancouver, B.C.
Continental Diamond Drilling Co. Ltd.....	Rouyn, Que.
Connors, T. Diamond Drilling Co. Ltd.....	744 W. Hastings St., Vancouver, B.C.
Consolidated Diamond Drilling Corp.....	Room 21 — 33 Melinda St., Toronto, Ont.
Demorest Drilling Limited.....	Noranda, Que.
Developers of Canada Reg. (A. Barton).....	Box 200, Senneterre, Que.
Dependence Diamond Drilling Co.....	13 Gov't. Road W., Kirkland Lake, Ont.
Globe Drilling and Exploration Co.....	204 — 4th St. N., Kenora, Ont.
Hawkins, H. (*).....	18 Vimy Ave., Timmins, Ont.
Heath and Sherwood.....	6 Duncan Ave., Kirkland Lake, Ont.
Inspiration Mining & Development Co. Ltd.....	619—12 Richmond St. E., Toronto, Ont.
Jones and Bradley Limited.....	Suite 6, David Bldg., Kirkland Lake, Ont.
Kuntz, Harry J.....	Malartic, Que.
La Rocque, T. E.....	Box 287, Val d'Or, Que.
Labine Bros.....	McKenzie Island, Ont.
McDonald, H. C.....	New Denver, B.C.
Melsaac, R. M.....	Flin Flon, Man.
Morissette, N. Diamond Drilling Ltd.....	Box 440, Haileybury, Ont.
Marks, J. M. (*).....	Qyon, Que.
Matheson Drilling & Exploration.....	Matheson, Ont.
National Diamond Drilling Co. Ltd.....	Box 508, Rossland, B.C.
Northern Diamond Drilling Co.....	707 McArthur Bldg., Winnipeg, Man.
Ontario Diamond Drilling Co. Ltd.....	203 MacKey Bldg., Sudbury, Ont.
Pacific Drilling & Exploration Co. Ltd.....	356 Alexander St., Vancouver, B.C.
Roy Bros.....	Malartic, Que.
Robinson Contracting Co. Ltd.....	804—850 Hastings St. W., Vancouver, B.C.
Smith and Travers Comapny Ltd.....	208 Walnut St., Sudbury, Ont.
Sprague and Henwood Ltd.....	188 Douglas St., Sudbury, Ont.
Sudbury Diamond Drilling Co. Ltd.....	619—12 Richmond St. E., Toronto, Ont.
Thompson Drilling & Mining Development Co. Ltd.....	Cranberry Portage, Man.

(*) Idle in 1944.

Section II.

Contract Drilling for Fuels

In 1944, there were 46 contractors who reported drilling for petroleum, natural gas or for other purposes. The footage drilled totalled 583,155 and the income from operations amounted to \$5,353,845; of the footage drilled 230,519 feet were completed by cable drill, 3,000 feet by diamond drill and 349,636 feet by rotary. Employees engaged on this work totalled 533 and salaries and wages paid amounted to \$1,086,878. Drilling done by oil companies with their own equipment are not included in this report. The industry in 1944 purchased diamonds, including readyset bits, etc., aggregating \$500 in value.

DIRECTORY 1944

The data shown in Table 397 were compiled from returns made by the following firms:

Name of firm	Head office address
NOVA SCOTIA—	
Kennedy, O. V.....	Bridgetown
QUEBEC—	
McMaster, W. R.....	Box 455, Caledonia, Ont.
ONTARIO—	
Ashton, J. L.....	550 King St. W., Chatham
Culver, Marvin & Son.....	R.R. 2, Selkirk
Davidson, F. L., & Son.....	Box 137, Wingham
Demaray, Clarence.....	Kerwood
Dennis, G.....	R.R. 2, Selkirk
Elk Development Syndicate.....	South Cayuga
Emerson, H. L.....	R.R. 1, Dunnville
Evans, H.....	Box 743, Tillsonburg
Heal, Andrew A.....	Box 264, Watford
Holmes, E. B.....	Bothwell
House, C. C.....	Stevensville
Hussey, W. J.....	Petrolia
Jackson, P. L., & Co.....	Dunnville
Kiser Bros.....	5 Sixth St., Chatham
Lymburner Bros. & Webber.....	Dunnville
McCrie & Stanley.....	18 Toronto St., Toronto
McCutcheon, T. J.....	225 Broad St. E., Dunnville
McKillop, Wm.....	Box 102, Hamilton
McLister, J. J.....	Dunnville
McMaster, W. R.....	Box 455, Caledonia
Patterson & Culver.....	Dunnville
Patterson, W. C.....	Jamestown, N.Y., U.S.A.
Perkins, J. E.....	Dunnville
Renwick, S.....	Bright
Roth, F. & H.....	R.R. 9, Dunnville
Shank Bros.....	Rainham Centre
Smith & Ehde.....	R.R. 1, Lowbanks
Stubble, H. H.....	225 Grand Ave. E., Chatham
Swent, Wm.....	Rainham Centre
MANITOBA—	
Coyle, D. J.....	796 McDermott Ave., Winnipeg
SASKATCHEWAN—	
Creelman, R. E.....	821 Ave. "C" North, Saskatoon
Northern Development Co. Ltd. (N.P.L.).....	Lloydminster
Withers, C. H. Drilling Co. Ltd.....	Lloydminster
ALBERTA—	
Alberta Drilling & Development Co.....	1 Central Bldg., Calgary
Bush, O. D.....	15 Board of Trade Bldg., Calgary
Can-Tex Drilling Co. Ltd.....	815 Lancaster Bldg., Calgary
Drilling Contractors Ltd.....	902 Lancaster Bldg., Calgary
General Petroleums Ltd.....	204 Lancaster Bldg., Calgary
K d'K Drilling Co.....	Vermilion
Machinery Depot Ltd.....	1029—10th Ave. W., Calgary
Newell & Chandler Ltd.....	337—8th Ave. W., Calgary
Regent Drilling Co. Ltd.....	Vermilion
Snyder, Head & Associates.....	258 Scarboro Ave., Calgary
Union Drilling & Development Co.....	403 Lancaster Bldg., Calgary
Williamson, M. J.....	Vermilion

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1943.

Arsenic.—White arsenic (As_2O_3) produced at Canadian plants at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Canadian refinery production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the gross amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba, Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

The price per pound used throughout 1943 to evaluate Canadian production was that agreed upon by the Canadian Producers and the British Government, with necessary adjustments.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20.671834 per fine ounce until the end of 1930. For succeeding years, unless otherwise specified, gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds. The average price used for 1943 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other primary plant products, and the recoverable silver in Canadian ores exported, at the average New York price for foreign ores in Canadian funds for the refined metal.

Tellurium and Selenium.—Refinery production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

The average price used for 1943 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements and quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country, the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

Unless otherwise arranged, the data relating to the operations of less than three firms producing the same commodity or mineral are not published separately.

DIRECTORY OF FIRMS

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given and the location of the properties worked in 1943 is also shown.

METAL MINING INDUSTRIES

The Alluvial Gold Mining Industry

NOTE.—(x) Active but not producing.

Name	Head office address	Location
BRITISH COLUMBIA—		
Anderson, M. A.	Wells	Cariboo M.D.
Anderson, Hardale and Vik.	Atlin	Atlin M.D.
Bindschadler, Carl.	Wells	Cariboo M.D.
B. and K. Placers	c/o Eric North, Wells	Cariboo M.D.
Bride, Maurice	Atlin	Atlin M.D.
Buckland, John	Atlin	Atlin M.D.
Barkerville Gold Mines	Box 1, Barkerville	Cariboo M.D.
Brister, J. V. Company	Atlin	Atlin M.D.
Columbia Development Co. Ltd.	410 King St. W., Kitchener, Ont.	Atlin M.D.
Cons. Mining & Smelting Co. of Canada Ltd.	Trail	Omineca M.D.
Doodif, James	Barkerville	Cariboo M.D.
Ennerdale Placers	Van Winkle	Cariboo M.D.
Falker, I. I.	Van Winkle	Cariboo M.D.
Fleury, J. and Chapman, W.	Wells	Cariboo M.D.
Goodheart, Fred	Tranquille	Kamloops M.D.
Grange, Chas. C.	Manson Creek	Omineca M.D.
Halverson, Gunnar	Barkerville	Cariboo M.D.
Holm, Arvid	Barkerville	Cariboo M.D.
Hasbrouck, W. C.	Keithley Creek	Quesnel M.D.
Huffman, J. A.	Ft. St. James	Omineca M.D.
Huffman, G. C.	Atlin	Atlin M.D.
Ivanic & Co.	Atlin	Atlin M.D.
Kywati Synd. (x)	1609 Royal Bank Bldg., Vancouver	Kamloops M.D.
Lindgrin, Gunnar	Atlin	Atlin M.D.
Lowhee Mining Co. Ltd.	917 Rust Bldg., Tacoma, Wash., U.S.A.	Cariboo M.D.
McKinnon, Chas. E.	Atlin	Atlin M.D.
McCrae, Alex	Revelstoke	Revelstoke M.D.
Miller, James W.	Marysville	Ft. Steele M.D.
Melline, Fred	Jesmond	Clinton M.D.
Murphy, Nathan	Atlin	Atlin M.D.
Noland, John W.	Atlin	Atlin M.D.
Obman, F. Co.	Atlin	Atlin M.D.
Prpich, T.	Atlin	Atlin M.D.
Risberg, Carl A.	Van Winkle	Cariboo M.D.
Savery, W. H.	c/o W. E. North, Wells	Cariboo M.D.
Spruce Creek Mining Co. Ltd.	Box 23, Atlin	Atlin M.D.
Spruce Creek Placers Ltd. (x)	College Centre Bldg., Seattle, Wash.	Atlin M.D.
Suran, John	Cranbrook	Ft. Steele M.D.
Taburt, I.	Dome Creek	Cariboo M.D.
Trehouse Hydraulic Gold Mining Co.	Barkerville	Cariboo M.D.
YUKON—		
Clear Creek Placers Ltd.	4556 University Way, Seattle, Wash.	Clear Creek
Holbrook Dredging Co. (x)	Dawson	Sixtymile
Iunde, V.	Mayo Landing	Mayo District
Middlecoff, E.	Mayo	Hiatt Creek
Yukon Cons. Gold Corp. Ltd.	1919 Marine Bldg., Vancouver, B.C.	various operations.

Principal Operators in the Canadian Auriferous Quartz Mining Industry

NOVA SCOTIA—		
Avon Gold Mines Ltd.	411 Confederation Bldg., Montreal, Que.	Oldham
Cons. Mining & Smelting Co. of Canada Ltd.	215 St. James St. W., Montreal, Que.	Caribou Mines
Queens Mines Ltd.	Box 667, Halifax	Malaga District
QUEBEC—		
Beattie Gold Mines (Quebec) Ltd.	25 King St. W., Toronto, Ont.	Duparquet
Belleterre Quebec Mines Ltd.	Belleterre	Belleterre
Blais, G. R.	Box 575, Amos	various
Camp Bird Mines Ltd. (x)	465 St. John St., Montreal	Varsan Tp.
Canadian Malartic Gold Mines Ltd.	25 King St. W., Toronto, Ont.	Malartic
Central Cadillac Mines Ltd.	132 St. James St. W., Montreal	Cadillac Tp.
Ceré, Léo	Box 220, Val d'Or	Villebon Tp.
Ceré, Gustave	Val d'Or	Villebon Tp.
Columbière Mines Ltd. (x)	Room 505, 67 Yonge St., Toronto, Ont.	Piedmont Tp.
		Bourlamaque Tp.

DIRECTORY OF FIRMS—Continued

The Canadian Auriferous Quartz Mining Industry—Continued

NOTE.—(x) Active but not producing.

Name	Head office address	Location
QUEBEC—Concluded		
Cons. Mining & Smelting Co. of Canada Ltd. (x)	215 St. James St. W., Montreal	Various.
Dome Exploration Co. (Quebec) Ltd. (x)	Bourlamaque	Various.
East Malartic Mines Ltd.	355 St. James St. W., Montreal	Fournière Tp.
Eureka Mining Reg.	Box 674, Val d'Or	Bourlamaque Tp.
Franceur Gold Mines Ltd.	941 Dominion Square Bldg., Montreal	Arntfield.
Hosking-Cockeram Prospecting Synd. (x)	McWatters P.O.	Joannes Tp.
Lamaque Mining Co. Ltd.	Bourlamaque	Bourlamaque
Lapa Cadillac Gold Mines Ltd.	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Cadillac Tp.
Marbener Malartic Mines Ltd. (x)	710 Excelsior Life Bldg., Toronto, Ont.	Dubuisson Tp.
Malartic Gold Fields Ltd.	355 St. James St. W., Montreal	Fournière Tp.
McWatters Gold Mines Ltd.	Drawer 988, Haileybury, Ont.	Dubuisson Tp.
Mic-Mac Mines Ltd.	c/o Royal Trust Co., Montreal	Fournière Tp.
Montmagny Gold Mines Ltd. (x)	c/o A. V. Corlett, Arntfield	Fournière Tp.
O'Brien Gold Mines Ltd.	Kewagama	Rouyn Tp.
Pershing Manitou Gold Mining Co. Ltd. (x)	132 St. James St. W., Montreal	Bousquet Tp.
Perron Gold Mines Ltd.	Perron	Beauchastel Tp.
Powell-Rouyn Gold Mines Ltd.	Box 200, Noranda	Cadillac Tp.
Reade, Douglas	Val d'Or	Pascal Tp.
Senator-Rouyn Ltd.	45 A. Main St., Hull	Senneville Tp.
Sigma Mines (Quebec) Ltd.	Bourlamaque	Rouyn Tp.
Siscoe Gold Mines Ltd.	907 Dominion Square Bldg., Montreal	Tibblemont Tp.
Sladen-Malartic Mines Ltd.	56 Sparks St., Ottawa, Ont.	Rouyn Tp.
Stadacona Rouyn Mines Ltd.	10 St. James St. E., Montreal	Bourlamaque Tp.
Sullivan Cons. Mines Ltd.	1604 Aldred Bldg., Montreal	Dubuisson Tp.
Thurbois Mines Ltd. (x)	201 Park Bldg., Windsor, Ont.	Dubuisson Tp.
Toburn Gold Mines Ltd. (x)	1809 Royal Bank Bldg., Toronto, Ont.	Dessarat Tp.
West Malartic Mines Ltd.	7000 Jeanne Mance St., Montreal	Bourlamaque Tp.
ONTARIO—		
Porcupine Area—		
Aunor Gold Mines Ltd.	1600 Royal Bank Bldg., Toronto	Delore Tp.
Bonetal Gold Mines Ltd.	1705 Sterling Tower Bldg., Toronto	Whitney Tp.
Broulan Porcupine Mines Ltd.	1705 Sterling Tower Bldg., Toronto	Whitney Tp.
Buffalo Ankerite Gold Mines Ltd.	Box 533, South Porcupine	Delore Tp.
Coniaurum Mines Ltd.	25 King St. W., Toronto	Tisdale Tp.
Delnite Mines Ltd.	Box 590, Timmins	Delore Tp.
Dome Mines Ltd.	36 Toronto St., Toronto	Tisdale Tp.
Hallnor Mines Ltd.	1600 Royal Bank Bldg., Toronto	Whitney Tp.
Hollinger Cons. Gold Mines Ltd.	Timmins	Timmins Tp.
Hoyle Gold Mines Ltd.	25 King St. W., Toronto	Hislop Tp.
McIntyre Porcupine Mines Ltd.	Schumacher	Whitney Tp.
Moneta Porcupine Mines Ltd.	67 Young St., Toronto	Cody Tp.
Naybob Mines Ltd.	c/o J. Montgomery, Federal Bldg., Toronto	Whitney Tp.
Pamour Porcupine Mines Ltd.	Pamour	Tisdale Tp.
Paymaster Cons. Mines Ltd.	Box 508, South Porcupine	Ogden Tp.
Preston East Dome Mines Ltd.	South Porcupine	Whitney Tp.
Kirkland Lake Area—		
Bidgood Kirkland Gold Mines Ltd.	Box 850, Kirkland Lake	Delore Tp.
Continental Kirkland Gold Mines Ltd. (x)	1809 Royal Bank Bldg., Toronto	Lebel Tp.
Kirkland Lake Gold Mining Co. Ltd.	314 Metropolitan Bldg., Toronto	Kirkland Lake.
Lake Shore Mines Ltd.	Kirkland Lake	Teck Tp.
Leta Explorations Ltd. (x)	67 Yonge St., Toronto	Teck Tp.
Macassa Mines Ltd.	1001 Federal Bldg., Toronto	Various.
Sylvanite Gold Mine Ltd.	Box 670, Kirkland Lake	Teck Tp.
Teck-Hughes Gold Mines Ltd.	14 Finkle St., Woodstock	Teck Tp.
Toburn Gold Mines Ltd.	1809 Royal Bank Bldg., Toronto	Teck Tp.
Upper Canada Mines Ltd.	1101 Federal Bldg., Toronto	Lebel Tp.
Wright-Hargreaves Mines Ltd.	1203 Liberty Bank Bldg., Buffalo, N.Y.	Gauthier Tp.
Larder Lake Area—		
Chesterville Larder Lake Gold Mining Co. Ltd.	330 Bay St., Toronto	Teck Tp.
Kerr-Addison Gold Mines Ltd.	30 King St. W., Toronto	McGarry Tp.
Omega Gold Mines Ltd.	Larder Lake	McGarry Tp.
Pelangio-Larder Mines Ltd. (x)	Drawer 967, Kirkland Lake	McVittie Tp.
Tovarich-Larder Gold Mines Ltd. (x)	372 Bay St., Toronto	McGarry Tp.
Yama Gold Mines Ltd.	171 Yonge St., Toronto	Hearst, McElroy and McVittie Tps. Catherine Tp.

DIRECTORY OF FIRMS—Continued

The Canadian Auriferous Quartz Mining Industry—Continued

NOTE.—(x) Active but not producing.

Name	Head office address	Location
ONTARIO—Continued		
<i>Matatchewan Area—</i>		
Hollinger Cons. Gold Mines Ltd.	Timmins	Powell Tp.
Matatchewan Cons. Mines Ltd.	25 King St. W., Toronto	Powell and Cairo Tps.
<i>Sudbury Area—</i>		
Jerome Gold Mines Ltd.	350 Bay St., Toronto	Osway and Huffman Tps.
<i>Algoma Area—</i>		
Deep Lake Gold Mines Ltd.	109 N. Union St., Akron, Ohio, U.S.A.	Michipicoten.
Regenery Metals	c/o E. W. Munro, Siderite	Michipicoten.
<i>Thunder Bay Area—</i>		
Hard Rock Gold Mines Ltd.	Geraldton	Ashmore Tp.
Leitch Gold Mines Ltd.	Beardmore	Eva and Summers Tps.
Little Long Lac Gold Mines Ltd.	25 King St. W., Toronto	Errington and Ashmore Tps.
Magnet Cons. Mines Ltd.	Geraldton	Errington Tp.
MacLeod-Cockshutt Gold Mines Ltd.	357 Bay St., Toronto	Ashmore Tp.
<i>Kenora Area—</i>		
Goldwood Gold Mine Ltd.	36 Toronto St., Toronto	Kenora District.
Kenwest Gold Mines Ltd.	10 Adelaide St. E., Toronto	Upper Manitou Lake
Wendigo Gold Mines Ltd.	Kenora	Witch Bay.
<i>Patricia District—</i>		
Berens River Mines Ltd.	Favourable Lake	Favourable Lake
Central Patricia Gold Mines Ltd.	Federal Bldg., Toronto	Crow River
Corhenour Willans Gold Mines Ltd.	68 Yonge St., Toronto	Dome Tp.
Hasaga Gold Mines Ltd.	Red Lake	Red Lake.
Madsen Red Lake Gold Mines Ltd.	67 Yonge St., Toronto	Baird and Heyson Tps.
McKenzie Red Lake Gold Mines Ltd.	Premier Trust Bldg., Toronto	Dome Tp.
McMarnac Red Lake Gold Mines Ltd.	66 King St. W., Toronto	Dome Tp.
Pickle Crow Gold Mines Ltd.	25 King St. W., Toronto	Pickle Lake.
Uchi Gold Mines Ltd.	25 King St. W., Toronto	Uchi Lake.
MANITOBA—		
Goldbeam Mines Ltd. (x)	75 Summit Ave., Toronto	West Hawk Lake
God's Lake Gold Mines Ltd.	395 Main St., Winnipeg	God's Lake.
San Antonio Gold Mines Ltd.	237 Curry Bldg., Winnipeg	Rice Lake.
Webb, T. R.	Cranberry Portage	Elbow Lake.
SASKATCHEWAN—		
Studer, Adolph	Sulphite Lake	Lac La Ronge.
BRITISH COLUMBIA—		
Bayonne Cons. Mines Ltd. (x)	308 Pacific Bldg., Vancouver	Nelson M.D.
Bralorne Mines Ltd.	555 Burrard St., Vancouver	Lilloet M.D.
Cariboo Gold Quartz Mining Co. Ltd.	Royal Bank Bldg., Vancouver	Cariboo M.D.
Dentonia-Gold Finch	Box #29, Greenwood	Greenwood M.D.
Gold Belt Mining Co. Ltd.	475 Howe St., Vancouver	Nelson M.D.
Hedley Mascot Gold Mines Ltd.	Royal Bank Bldg., Vancouver	Osoyoos M.D.
Island Mountain Mines Co. Ltd.	Wells	Cariboo M.D.
Kelowna Exploration Co. Ltd.	Hedley	Osoyoos M.D.
Kootenay Belle Gold Mines Ltd.	Stock Exchange Bldg., Vancouver	Nelson M.D.
Livingstone Mining Co.	Blewett	Blewett.
Nelson Slocan Cons. Mines Ltd.	490 Baker St., Nelson	Nelson M.D.
Pioneer Gold Mines of B.C. Ltd.	607 Rogers Bldg., Vancouver	Lilloet M.D.
Privateer Mine Ltd. and Prident Gold Mines Ltd.	Room 602, 475 Howe St., Vancouver	Albarni M.D.
Sheep Creek Gold Mines Ltd.	616 Stock Exchange Bldg., Vancouver	Nelson M.D.
Silbak Premier Mines Ltd.	626 Pender St. W., Vancouver	Portland Canal M.D.
NORTHWEST TERRITORIES—		
Cons. Mining & Smelting Co. of Canada Ltd.	Trail, B.C.	Yellowknife M.D.
Negus Mines Ltd.	410 Royal Bank Bldg., Toronto, Ont.	Yellowknife M.D.
Rycon Mines Ltd.	c/o Cons. Mining & Smelting Co. of Canada, Trail, B.C.	Yellowknife M.D.
Thompson-Lundmark Gold Mines Ltd.	c/o Cons. Mining & Smelting Co. of Canada, Trail, B.C.	Yellowknife M.D.

Operators in Canadian Copper-Gold-Silver Mining Industry

QUEBEC—		
Aldermae Copper Corp. Ltd.	Dominion Square Bldg., Montreal	Beauchastel Tp.
Bagamac Mines Ltd. (x)	Oak Ridges, Ont.	Ascot Tp.
Donalds Mines Ltd. (x)	132 St. James St. W., Montreal	Rouyn Tp.
Létourneau, Joseph (x)	Disraeli	Rouyn Tp.
		Stratford Tp.

DIRECTORY OF FIRMS—Continued

The Auriferous Quartz Mining Industry—Concluded

NOTE.—(x) Active but not producing.

Name	Head office address	Location
QUEBEC—Concluded		
Macdonald Mines Ltd. (x)	132 St. James St. W., Montreal	Dufresnoy Tp.
Metalore Mining Corp. Ltd. (x)	156 Yonge St., Toronto, Ont.	Perron Tp.
Noranda Mines Ltd.	Royal Bank Bldg., Toronto, Ont.	Desmeloizes Tp.
Normetal Mining Corp. Ltd.	350 Bay St., Toronto, Ont.	Rouyn Tp.
Naus, Roy D. (x)	R.R. 2, Compton	Desmeloizes Tp.
Sullivan Cons. Mines Ltd. (x)	1604 Aldred Bldg., Montreal	Weedon Tp.
Touton Mining & Exploration Co. (x)	500 Place d'Armes, Montreal	Bourlamaque Tp.
Waite Amulet Mines Ltd.	Noranda	Fabre Tp.
		Dufresnoy Tp.
		Duprat Tp.
ONTARIO—		
Algoma Copper Mines Ltd.	199 Bay St., Toronto	Tp. 1A. Algoma.
Kam-Kotia Porcupine Mines Ltd.	Timmins	Robb Tp.
MANITOBA—		
Emergency Metals Ltd.	Royal Bank Bldg., Winnipeg	The Pas M.D.
Hudson Bay Mining & Smelting Co. Ltd.	Royal Bank Bldg., Winnipeg	The Pas M.D.
Sherritt Gordon Mines Ltd.	25 King St. W., Toronto, Ont.	The Pas M.D.
SASKATCHEWAN—		
Hudson Bay Mining & Smelting Co. Ltd.	Royal Bank Bldg., Winnipeg	Flin Flon area.
BRITISH COLUMBIA—		
Britannia Mining & Smelting Co. Ltd.	Britannia Beach	Vancouver M.D.
Granby Cons. Mining, Smelting & Power Co. Ltd.	675 West Hastings St., Vancouver	Similkameen M.D.
Industrial Metals Mining Co. Ltd. (x)	101 Royal Trust Bldg., Vancouver	Nanaimo M.D.
Twin "J" Mines Ltd.	Box 398, Duncan	Victoria M.S.
Austin Mining Synd. (Nerlip)	Box 643, Cobalt, Ont.	Coleman Tp.
Ankario & Bell (Silver Bar)	3033 N. Humboldt Ave., Milwaukee 12, Wis.	Cobalt
Bellaysee Mineral Interests Ltd.	Room 710, 36 Toronto St., Toronto, Ont.	South Lorraine
Cobalt Products Ltd. (Provincial) (t)	67 Yonge St., Toronto, Ont.	Bucke Tp.
(Agaonic) (x)		Gillies Limit
Comet Leasing Co. (Kerr Lake)	Box 274, Cobalt, Ont.	Coleman Tp.
Cross Lake Lease (O'Brien)	Box 390, Cobalt, Ont.	Houltaim Tp.
(Miller Lake O'Brien)		Coleman Tp.
Davis, Norman B. (x)	512 Victoria Bldg., Ottawa, Ont.	Werner Lake
McCready, W. E. (Nipissing)	Cobalt, Ont.	Cobalt
Mercier, Raoul (Trethewey)	Box 547, Cobalt, Ont.	Coleman Tp.
(Foster)		
Murphy and Landry (Conogas)	Cobalt, Ont.	Cobalt
(Trethewey)		
Nipissing Mining Co. Ltd.	1007 Excelsior Life Bldg., Toronto	Cobalt
Presse, A. (Nipissing)	Cobalt, Ont.	Cobalt
O'Shaughnessy, C. V. J. (x)	Box 319, Cobalt, Ont.	Custom mill—Cobalt
Peterson Lease (Hudson Bay)	52 Nickel St., Cobalt, Ont.	Cobalt
Rowe, Stuckey & Parsons (Frontier)	Box 755, Cobalt, Ont.	Silver Centre
Sanymac Milling & Development Co. Ltd. (x)	501 Central Building, Toronto, Ont.	Coleman Tp.
(Congias and Red Jacket)		
Sutherland, J. H. (Lawson)	Cobalt, Ont.	Coleman
Silanco Mining & Smelting Corp. Ltd. (x)	45 Richmond St. W., Toronto, Ont.	Bucke Tp.
Smith, Chas. (Cobalt Lake)	Cobalt, Ont.	Gillies Limit
Sycee Cobalt Silver Mines Ltd.	Fasken & Co., 36 Toronto St., Toronto, Ont.	Cobalt
Taylor, W. D. (Lorrain Trout Lake)	Cobalt	Coleman Tp.
Waldag Prospecting Synd. (Waldman)	Room 304, 21 King St. E., Toronto, Ont.	South Lorraine
Windsor Cobalt Silvers Ltd. (Cobnor) (x)	Room 15, 9 Toronto St., Toronto, Ont.	Gillies Limit
		Bucke Tp.

(t) Now operated by Silanco Mining & Smelting Corp. Ltd.

(x) Conducted milling operations.

NOTE.—In addition to the names listed, there were several small shippers from whom official reports were unobtainable. Mine names shown in brackets.

The Canadian Silver-Lead-Zinc Mining Industry

QUEBEC—		
Federal Zinc & Lead Co. Ltd. (x)	708 Drummond Bldg., Montreal	Lemieux Tp.
Golden Manitou Mines Ltd.	Room 1104, 330 Bay St., Toronto, Ont.	Bourlamaque Tp.
Lyall and Beidelman (x)	708 Drummond Bldg., Montreal	Lemieux Tp.
New Calumet Mines Ltd.	25 King St. W., Toronto, Ont.	Calumet Island.
Siscoe Metals Ltd. (Tetreault mine)	907 Dominion Square Bldg., Montreal	Portneuf Co.
ONTARIO—		
Beausoleil, Geo. & Co. (x)	221 Notre Dame St. W., Montreal, Que.	Enterprise.
Lake Geneva Mining Co. Ltd.	941 Dominion Square Bldg., Montreal, Que.	Hess Tp.
Ozone War Metals Mining Synd. Ltd. (x)	39 La Belle Bldg., Windsor, Ont.	Prospecting.

DIRECTORY OF FIRMS—Continued

The Canadian Silver-Lead-Zinc Mining Industry—Concluded

(x) Active but not producing.

Name of operator	Head office address	Location of mine
YUKON—		
Bjornnes, Ellef.....	Mayo.....	Mayo M.D.
Settlemier & Birmingham.....	Mayo.....	Mayo M.D.
Treadwell Yukon Corp. Ltd. (a).....	1022 Crocker Bldg., San Francisco, Cal.....	Mayo M.D.
BRITISH COLUMBIA—(†)		
Ainsmore Cons. Mines Ltd.....	121 Yonge St., Toronto, Ont.....	Ainsworth.
Base Metals Mining Corp. Ltd.....	Suite 602, 350 Bay St., Toronto, Ont.....	Field.
Campbell, Colin J. (Bosun).....	4875 West 5th Ave., Vancouver.....	New Denver.
Cons. Mining & Smelting Co. of Canada Ltd.....	Trail.....	Kimberley.
Doney, E. and Vandergriff, E. (Victor).....	Sandon.....	Sandon.
Highland-Bell Ltd.....	Creston.....	Beaverdell.
Kootenay Belle Gold Mines Ltd. (Whitewater).....	916 Stock Exchange Bldg., Vancouver.....	Retallock
Kootenay Florence Project.....	c/o Wartime Metals Corp., 637 Craig St. W., Montreal, Que.....	Ainsworth M.D.
McCreedy, G. E. (Caledonia).....	Retallock.....	Ainsworth M.D.
Ominoca Base Metals Ltd. (x) (Silver Standard).....	475 Howe St., Vancouver.....	New Hazelton.
Petersen, Eugene H., (New Spring field).....	Box 182, Sandon.....	Sandon.
Providence Mine Synd.....	Box 629, Greenwood.....	Greenwood M.D.
Reco Mountain Base Metals Mines Ltd.....	c/o Hamilton and Wragge, Nelson.....	Sandon.
Sheep Creek Gold Mines Ltd. (Zincton).....	616 Stock Exchange Bldg., Vancouver.....	Zincton.
Wanke, Ed. A. (Cariboo).....	Greenwood.....	Rock Creek.
Western Exploration Co. Ltd.....	Silverton.....	Slocan Lake.

(a) Now in liquidation.

(†) Exclusive of several small shippers who are usually leasees.

The Nickel-Copper Mining, Smelting and Refining Industry

ONTARIO—		
Falconbridge Nickel Mines, Ltd.....	25 King St. W., Toronto.....	Falconbridge Tp.
International Nickel Company of Canada, Limited.....	Copper Cliff.....	Mines: Tps. of Levack, Snider, McKim and- Garson. Smelters: Copper Cliff and Coniston. Nickel refinery: Port Colborne. Copper refinery: Copper Cliff.
Nickel Offsets Ltd.....	Room 1701, 372 Bay St., Toronto.....	Foy Tp.
Ontario Nickel Mines Ltd.....	Room 304, 350 Bay St., Toronto.....	MacLennan Tp.
Dominion Nickel Mining Corp. Ltd. (x).....	Room 28, 24 King St. W., Toronto.....	Norman Tp.
Harlin Nickel Mines Ltd.....	Room 503, 357 Bay St., Toronto.....	Porquis Jct.

THE MISCELLANEOUS METAL MINING INDUSTRY

(x) Active but not producing.

Name of firm and product	Head office address	Location of mine or plant
Aluminum—		
Alumina Company of Canada Limited.....	1700 Sun Life Bldg., Montreal, Que.....	Arvida Que. Shawinigan Falls, Que. La Tuque, Que. Isle Maligne, Que. Beauharnois, Que.
Antimony—		
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Beryl—		
Canadian Beryllium Mines & Alloys Ltd. (x).....	Room 401, 100 Adelaide St. W., Toronto, Ont.....	Renfrew Co., Ont.
Universal Light Metals Co. (x).....	28 James St. S., Hamilton, Ont.....	Renfrew Co., Ont.
Bismuth—		
Deloro Smelting & Refining Co. Ltd. (x).....	900 Victoria Bldg., Ottawa, Ont.....	Deloro, Ont.
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.

DIRECTORY OF FIRMS—Continued

THE MISCELLANEOUS METAL MINING INDUSTRY—Continued

(x) Active but not producing.

Name of firm and product	Head office address	Location of mine or plant
Cadmium—		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Que.	Trail, B.C.
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Bldg., Winnipeg, Man.	Flin Flon, Man.
Chromite—		
Alchrome Prospecting Synd. (x)	11 King St. W., Toronto, Ont.	Matapedia Co., Que.
Asbestos Corporation Ltd.	Thetford Mines, Que.	Thetford Mines, Que.
Chrome Association.	c/o Simeon Bergeron, 142 Notre Dame St., Black Lake, Que.	Black Lake, Que.
Chromite Limited.	404 Notre Dame St. W., Montreal, Que.	St. Cyr, Que.
Chromore Ltd.	Manoir Hebert, Thetford Mines, Que.	Thetford Mines, Que.
Corriveau, Alexandre (x)	Disraeli, Que.	Garthey Tp., Que.
Labbe, Ward & Lambert	Thetford Mines, Que.	Coleraine Tp., Que.
Labonte and Metiver	7 rue Notre Dame, Thetford Mines, Que.	Coleraine Tp., Que.
Mount Albert Mining Co. Ltd. (x)	1010 Canada Cement Bldg., Montreal, Que.	Gaspé District, Que.
Morisset, R. and Co.	Black Lake, Que.	Coleraine Tp., Que.
Pare, Orel	Black Lake, Que.	Coleraine Tp., Que.
Roberge, J. W.	Thetford Mines, Que.	Thetford District, Que.
Thetford Ferro Chrome Reg.	Thetford Mines, Que.	Coleraine Tp., Que.
Wartime Metals Corp. (Chromeraine Project)	637 Craig St. W., Montreal, Que.	Coleraine Tp., Que.
Iron Ore—		
Dominion Steel & Coal Corp. Ltd.	Sydney, N.S.	Bathurst, N.B.
Goyette, A. E. (x)	4295 St. Hubert St., Montreal, Que.	Arthabaska Co., Que.
Hollinger North Shore Exploration Co. Ltd. (x)	721 Royal Bank Bldg., Montreal, Que.	New Quebec.
Algoma Ore Properties Ltd.	Cornwall Bldg., Sault Ste. Marie, Ont.	Algoma District, Que.
Great Lakes Iron Mines Lts. (x)	Room 505, 67 Yonge St., Toronto, Ont.	Atikokan, Ont.
Gunflint Iron Mines Ltd. (x)	Room 412, 11 King St. W., Toronto, Ont.	Round Lake, Ont.
Hollinger Cons. Gold Mines Ltd. (x)	Timmins, Ont.	Shebandowan, Ont.
Michipicoten Iron Mines Ltd. (x)	Room 2810, 25 King St. W., Toronto, Ont.	Halton Co., Ont.
Midwest Iron Corp. Ltd. (x)	36 Toronto St., Toronto, Ont.	Algoma District, Ont.
Rebair Gold Mines Ltd. (x)	9 Adelaide St. E., Toronto, Ont.	Arikokan, Ont.
Steep Rock Iron Mines Ltd. (x)	25 King St. W., Toronto, Ont.	Atikokan, Ont.
Tomahawk Iron Mines Ltd. (x)	Suite 405, 67 Yonge St., Toronto, Ont.	Hastings Co., Ont.
Indium—		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Que.	Trail, B.C.
Lithium Ore—		
Hudson Bay Mining & Smelting Co. Ltd. (x)	500 Royal Bank Bldg., Winnipeg, Man.	Cat Lake, Man.
Lithium Corporation of Canada Ltd. (x)	403 Avenue Bldg., Winnipeg, Man.	Bernic and Cat Lakes, Man.
Sheritt Gordon Mines Ltd. (x)	25 King St. W., Toronto, Ont.	Crowduck Bay, Man.
		East Brantree, Man.
Magnesium—		
Consolidated Mining & Smelting Company of Canada Ltd. (x)	215 St. James St., Montreal, Que.	Trail, B.C.
Dominion Magnesium Ltd.	Room 1107, 67 Yonge St., Toronto, Ont.	Halley, Ont.
Manganese Ore—		
British Manganese Mines Ltd.	Room 1102, 45 Richmond St. W., Toronto, Ont.	Sussex, N.B.
Mercury—		
Bralorne Mines Ltd.	555 Burrard St., Vancouver, B.C.	Omineca District, B.C.
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Que.	Pinchi Lake, B.C.
Molybdenite—		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Que.	Salmo, B.C.
Creamar Moly Mines Ltd.	410 Royal Bank Bldg., Toronto, Ont.	Searchmont, Ont.
Farley Mining Co.	1954 Main St., Hull, Que.	Gatineau Dist., Que.
Gayhurst Prospecting Synd. (x)	Room 428, 67 Yonge St., Toronto, Ont.	Prospecting, Que.
Indian Molybdenum Ltd.	Bourlamaque, Que.	Preissac, Que.
Norserman Mines Ltd. (x)	80 Richmond St. W., Toronto, Ont.	LaCorne Tp., Que.
Norwin Molybdenite Mines Ltd. (x)	Room 405, 26 Queen St. E., Toronto, Ont.	Eardley Tp., Que.
Molyca Mines Ltd.	3778 Batrel St., Montreal, Que.	Oldfield Tp., Que.
Quyon Molybdenite Co. Ltd.	Quyon, Que.	Quyon, Que.
Steeley Mining Corp. Ltd. (x)	80 King St. W., Toronto, Ont.	Preissac Tp., Que.
Sullivan Cons. Mines Ltd. (x)	1604 Aldred Bldg., Montreal, Que.	LaCorne Tp., Que.
Wartime Metals Corp.	637 Craig St. W., Montreal, Que.	LaCorne Tp., Que.
		Bagot Tp., Ont.
Pitchblende—		
Eldorado Mining & Refining	80 King St. W., Toronto, Ont.	Great Bear Lake, N.W.T
Selenium-Tellurium—		
International Nickel Co. of Canada Ltd.	Copper Cliff, Ont.	Copper Cliff, Ont.
Canadian Copper Refiners Ltd.	1600 Royal Bank Bldg., Toronto, Ont.	Montreal East, Que.

DIRECTORY OF FIRMS—Continued

THE MISCELLANEOUS METAL MINING INDUSTRY—Concluded

(x) Active but not producing.

Name of firm and product	Head office address	Location of mine or plant
Tin— Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Titanium Ore— Baie St. Paul Titanic Iron Ore Co..... Brossard, Hercule (x)..... Coulombe, J.....	Baie St. Paul, Que..... La Malbaie, Que..... 71 Ave. Royal Monument, Quebec, Que.....	St. Urbain, Que. La Malbaie, Que. St. Urbain, Que.
Tungsten Concentrates— B.C. War Metals Research Board (†).....	University of British Columbia, Vancouver, B.C.....	Vancouver, B.C.
Bralorne Mines Ltd.....	555 Burrard St., Vancouver, B.C.....	Bralorne, B.C.
Bureau of Mines (Federal) (†).....	Booth St., Ottawa, Ont.....	Ottawa, Ont.
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Nelson M.D., B.C. (x) Omineca M.D., B.C. Greenwood M.D., B.C. (x) Albert Canyon, B.C.
Eldridge, G. S. (x).....	567 Hornby St., Vancouver, B.C.....	Timmins, Ont.
Hollinger Cons. Gold Mines Ltd. (†).....	Timmins, Ont.....	Timmins, Ont.
Little Long Lac Gold Mines Ltd. (†).....	Geraldton, Ont.....	Geraldton, Ont.
Phillips, Edwin.....	Gold Bridge, B.C.....	Lillooet Dist., B.C.
Quebec Department of Mines (†).....	Quebec, Que.....	Val d'Or, Que..
Wartime Metals Corp. (Emerald).....	637 Craig St. W., Montreal, Que.....	Salmo, B.C.

(†) Treated ores from various Canadian mines.

The Canadian Non-Ferrous Smelting and Refining Industry

Quebec— Aluminum Company of Canada Ltd.....	1700 Sun Life Bldg., Montreal, Que.....	Arvida, Shawinigan Falls, La Tuque, Isle Maligne, Beauharnois, Montreal East, Noranda.
Canadian Copper Refiners Ltd.....	1600 Royal Bank Bldg., Toronto, Ontario ..	
Noranda Mines Limited.....	1600 Royal Bank Bldg., Toronto, Ontario ..	
Ontario— Deloro Smelting Refining Co. Limited.....	Deloro, Ontario ..	Deloro.
Dominion Magnesium Ltd.....	67 Yonge St., Toronto, Ont.....	Haley.
Eldorado Mining and Refining.....	80 King Street W., Toronto, Ontario.....	Port Hope.
Falconbridge Nickel Mines Ltd.....	25 King Street W., Toronto, Ontario.....	Falconbridge.
International Nickel Co. of Canada Limited.	Copper Cliff, Ontario.....	Copper Cliff, Coniston, Port Colborne.
Manitoba— Hudson Bay Mining and Smelting Co. Limited.....	500 Royal Bank Bldg., Winnipeg, Manitoba..	Flin Flon.
British Columbia— Consolidated Mining and Smelting Co. of Canada Limited.....	Trail, B.C.....	Trail.

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Address	Location
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Trenton	District— Pictou.
Beech Hill Coal Co.	River Hebert	Cumberland.
Bras d'Or Coal Co., Ltd.	Bras d'Or	Cape Breton.
Cumberland Ry. & Coal Co.	Sydney	Cumberland.
Dominion Coal Co. Ltd.	Sydney	Cape Breton.
Doucet, S. J.	Inverness	Inverness.
Evans, G. V.	St. Rose	Inverness.
Gordon, Hugh	Joggins	Cumberland.
Greenwood Coal Co. Ltd.	New Glasgow	Pictou.
Hillcrest Mining Co. Ltd.	River Hebert	Cumberland.
Indian Cove Coal Co., Ltd.	Sydney Mines	Cape Breton.
Intercolonial Coal Co., Ltd.	Westville	Pictou.
Inverness Coal Mine	Inverness	Inverness.
Joggins Coal Co., Ltd.	Amherst	Cumberland.
Kempton Coal Mine	Kempton	Cumberland.
McLellan & Sons, J.A.	Inverness	Inverness.
Margaree Steamship Co.	Inverness	Inverness.
Maritime Coal Ry. & Pr. Co. Ltd.	Amherst	Cumberland.
Old Sydney Collieries Ltd.	Trenton	Cape Breton.
Standard Coal Co. Ltd.	Amherst	Cumberland.
Sullivan Coal Co. Ltd.	Sydney Mines	Cape Breton.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	Minto	County— Queens.
Banks, H. F. Coal Co.	Minto	Queens.
Butler, Stanley	Newcastle Bridge	Queens.
Crawford, E. S.	Newcastle Bridge	Queens.
Evans, W. B.	Minto	Queens.
Flower, H. L.	Newcastle Creek	Queens.
Fearn, William	Coal Creek	Queens.
Fearon, Bertrum	Beersville	Kent.
Girvan, H. H.	Jailletville	Kent.
Grant, A.	Minto	Queens.
Horgan, F. J.	Chipman	Queens.
King, G. H.	Chipman	Queens.
McDonald, J. F.	Minto	Queens.
McMann, Hugh	Newcastle Creek	Queens.
Minto Coal Co. Ltd.	Minto	Queens.
Miramichi Lumber Co. Ltd.	Minto	Queens.
Myles, Geo. H.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Rothwell Coal Co. Ltd.	Minto	Queens.
Welton Harvey Ltd.	Minto	Queens.
Welton & Henderson Ltd.	Minto	Queens.
Wisely, W. B.	Chipman	Queens.
Woodcock, A. G.	Fredericton	Queens.
Yeamans, C. S.	Newcastle Bridge	Queens.
MANITOBA—		
Goodlands Mine Co.	Goodlands.	
SASKATCHEWAN—		
NOTE.—SOURIS AREA— Comprises mines at or near Bienfait, Taylorton, Pinto, Estevan and Roche Perceé.		
WOOD MOUNTAIN AREA— Comprises mines at or near Assiniboia, Bengough, Willow Bunch and Wood Mountain.		
SHAUNAVON AREA— Comprises mines at or near Shaunavon, Dollard, South Fork and East End.		
Anderson, Peter	Maxstone	Area— Wood Mountain.
Anderson, Niel	Estevan	Souris.
Assels, Glen	Shaunavon	Shaunavon.
Banks, H.	Bienfait	Souris.
Banks, H.	Pinto	Souris.
Baniulis Bros. Ltd.	Bienfait	Souris.
Beahm, George	Roan Mine	Wood Mountain.
Beauchesne, O.	St. Victor	Wood Mountain.
Bednarik, John	Shaunavon	Shaunavon.
Belz, Werner	Buffalo Gap	Wood Mountain.
Bembridge, J.	Bienfait	Souris.
Berge, Telford	Buffalo Gap	Wood Mountain.
Berg, J.	Dollard	Shaunavon.
Bjarne, L.	Minton	Wood Mountain.
Blondeau, A.	Roche Perceé	Souris.
Bouffard, Emile	Willow Bunch	Wood Mountain.
Bourguin & Sons, L. E.	Estevan	Souris.
Boyer, T. & Sons	Estevan	Souris.
Brandieze, Jos.	Coronach	Wood Mountain.
Brown, H.	Big Beaver	Wood Mountain.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
SASKATCHEWAN—Continued		Area—
Brown, Alton G.	Wideview	Wood Mountain.
Coats & Kingdon	Bienfait	Souris.
Culbert, Wesley	Minton	Wood Mountain.
Dorrell, A. C.	Eastend	Shaunavon.
Eastern Collieries of Bienfait	Estevan	Souris.
Eikemo & Peterson	Gladmar	Wood Mountain.
Emery, E. G.	Readlyn	Wood Mountain.
Estevan Coal Co.	Estevan	Souris.
Fair, J. A.	Hartree	Wood Mountain.
Finnberg, N.	Fir Mountain	Wood Mountain.
Fister, J. J.	Big Beaver	Wood Mountain.
Flower Bros.	Estevan	Souris.
Freeman, Bruce	Southfork	Shaunavon.
Furniskieg, A.	Minton	Wood Mountain.
Gill, William	Estevan	Souris.
Glombowski, Rudolph	Ardill	Wood Mountain.
Gosselin, Raymond	Willow Bunch	Wood Mountain.
Gosselin, C.	Dollard	Shaunavon.
Guse, L.	Bengough	Wood Mountain.
Higgins, James	Willow Bunch	Wood Mountain.
High Test Lignite Coal Co. Ltd.	Bienfait	Souris.
Jacques, Jos.	Southfork	Shaunavon.
Jenish Bros.	Estevan	Souris.
Jones, Wm.	Viceroy	Wood Mountain.
Karlson, Ernest	Glentworth	Wood Mountain.
Kirkpatrick, H.	Shaunavon	Shaunavon.
Kissner, A.	Assiniboia	Wood Mountain.
Klyne & Son, T.	Roche Percee	Souris.
Knoblauch, Ed.	Shaunavon	Shaunavon.
Krzeminski, Z.	Estevan	Souris.
Labocetta, John	Wood Mountain	Wood Mountain.
Lapointe, Louis	Buffalo Gap	Wood Mountain.
Larson, Peter	Eastend	Shaunavon.
Lebeck, A.	Buffalo Gap	Wood Mountain.
Lee, Austin M.	Big Beaver	Wood Mountain.
Livingston, Kelly	Rockglen	Wood Mountain.
Matheson & Uhrich	Pinto	Souris.
McCaig, M.	Fife Lake	Wood Mountain.
McGills, J. M.	Willow Bunch	Wood Mountain.
Man. & Sask. Coal Co. Ltd.	503 Ave. Bldg., Winnipeg, Manitoba	Souris.
Morrison, Ray	Big Beaver	Wood Mountain.
Nordstrom, C.	Estevan	Souris.
North West Coal Co.	Bienfait	Souris.
Olshanoski, J.	Estevan	Souris.
Osjust, Steve	Estevan	Souris.
Parkinson, Geo.	Estevan	Souris.
Paulhus, J. A.	Willow Bunch	Wood Mountain.
Pilsner, J.	Scout Lake	Wood Mountain.
Pohl, Henry	Buffalo Gap	Wood Mountain.
Raketti, J. B.	Shaunavon	Shaunavon.
Riedel Bros.	Bienfait	Souris.
Roche Percee Coal Mining Co. Ltd.	Roche Percee	Souris.
Rock Spring Coal Co.	Pinto	Souris.
Salaba, G. J.	Willow Bunch	Wood Mountain.
Sanftleben, Geo.	Readlyn	Wood Mountain.
Scott, Ervin	Viceroy	Wood Mountain.
Slater, Dan	Bengough	Wood Mountain.
South Cambrian Ltd.	Pinto	Souris.
Southernwood, E.	Estevan	Souris.
Spirka & Novak	Shaunavon	Shaunavon.
Stirling, A.	Readlyn	Wood Mountain.
Taje & Co., Ltd.	Estevan	Souris.
Tarita, Paul	Stonehenge	Wood Mountain.
Tessier & Insko	Estevan	Souris.
Tipple, J.	Lonesome Butte	Wood Mountain.
Tisdale, A. E.	Estevan	Souris.
Treleaven, Wm.	Bengough	Wood Mountain.
Treleaven, Wm.	Bengough	Wood Mountain.
Wagner & Mattison	Bengough	Wood Mountain.
Western Dom. Coal Mines Ltd.	Taylorlton	Souris.
Wilhelm, John	Verwood	Wood Mountain.
Wilkins, H. W.	Shaunavon	Shaunavon.
Wilkins, L. F.	Shaunavon	Shaunavon.
Youngberg Bros., H. McBurney & C. H. Uhrich	Willow Bunch	Wood Mountain.
ALBERTA—		District—
Bituminous—		Nordegg.
Braceau Collieries Ltd.	25 King St. W., Toronto, Ontario	Mountain Park.
Cadomin Coal Co. Ltd.	418 McLeod Bldg., Edmonton	Cascade.
Canmore Mines Ltd.	Canmore	Crownest.
Hillcrest Mohawk Collieries Ltd.	Bellevue	Crownest.
Holmes, F.	Pincher Creek	Crownest.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
ALBERTA—Continued		
Bituminous—Continued		
International Coal & Coke Co. Ltd.	Coleman	District—
K. D. Collieries Ltd.	103 Pinder Bldg., Saskatoon, Sask.	Crowsnest.
Luscar Coals Ltd.	410 Tegler Bldg., Edmonton.	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd.	Coleman	Mountain Park.
Mountain Park Coals Ltd.	410 Tegler Bldg., Edmonton.	Crowsnest.
West Canadian Collieries Ltd.	Blairmore	Mountain Park.
Wheatley, F. & Sons	Banff	Crowsnest.
Wilson, B. A.	Pincher Creek	Cascade.
		Crowsnest.
Sub-bituminous—		
Alexo Coal Co. Ltd.	Alexo	Saunders.
Bighorn & Saunders Creek Collieries Ltd.	Saunders	Saunders.
Coal Valley Mining Co. Ltd.	Coal Valley	Coalspur.
Davies, G. C.	Priddis	Pekisko.
Foothills Collieries Ltd.	Foothills	Coalspur.
Jasper Coals Ltd.	Edmonton	Prairie Creek.
Keith Albert	Lundbreck	Pincher.
Lakeside Coals Ltd.	Edmonton	Coalspur.
McLeod River Hard Coal Co. (1941) Ltd.	Nanaimo, B.C.	Coalspur.
Sterling Collieries Co. Ltd.	Edmonton	Coalspur.
Swan, H. & Son.	Priddis	Pekisko.
Thirty-Two Collieries Ltd.	Edmonton	Coalspur.
Lignite—		
Aetna Coal Co.	East Coulee	Drumheller.
Ajax Coal Co.	Medicine Hat	Redcliff.
Arcadia Coal Mines Ltd.	Willow Creek	Drumheller.
Atlas Coal Mine (Regal Coal Co. Ltd.)	East Coulee	Drumheller.
Baldwin, J. N. & L. A.	Grand Prairie	Halcourt.
Balogh, Aaron	Carbon	Carbon.
Bailey Bros. & Jackson	Gadsby	Castor.
Banner Coals Ltd.	Edmonton	Edmonton.
Beverly Coal Co. Ltd.	Beverly	Edmonton.
Big Valley Coal Co.	Big Valley	Big Valley.
Birnwel Coal Ltd.	Calgary	Brooks.
Bish Bros.	Forestburg	Castor.
Blackfoot Indian Agency	Gleichen	Gleichen.
Blades, James	Delburne	Ardley.
Boice & Ginther	Elmora	Big Valley.
Bordula, A. J.	Hanna	Sheerness.
Bradshaw, Richard	Trochu	Carbon.
Bradley, James	Foreman	Castor.
Bright Service Coal Mine	Edmonton	Edmonton.
Brilliant Coal Co.	Drumheller	Drumheller.
Burn Brite Coal Co.	Drumheller	Drumheller.
Bush Mines Ltd.	Edmonton	Edmonton.
Buxton, Arthur	Lonira	Whitecourt.
Campbell, C. C.	Trochu	Carbon.
Campbell & O'Reilly	Dimsdale	Halcourt.
Campkin, R. & Sons	Lousana	Big Valley.
Camrose Collieries Ltd.	Camrose	Camrose.
Camarta, John	Cardiff	Edmonton.
Canadian Dinant Coal Co.	Three Hills	Carbon.
Castor Creek Collieries Ltd.	Castor	Castor.
Chester Mine	Lethbridge	Lethbridge.
Chiarello, Frank	Legal	Edmonton.
Chinook Coal Co.	Sheerness	Sheerness.
Chiswick, J.	Gadsby	Castor.
Commander Coal Mine	Drumheller	Drumheller.
Continental Coal Corp.	Grassy Lake	Taber.
Cordel, J. F.	Halkirk	Castor.
Cotek, William	R. R. 3, S. Edmonton	Edmonton.
Dahl & Cage	Halcourt	Halcourt.
Dawson Coal Ltd.	Edmonton	Edmonton.
Denio, Ernest	Drumheller	Drumheller.
Dickinson, Knight and Dickinson	R. R. 2, St. Albert	Edmonton.
Dickinson & Knight	Carbondale	Edmonton.
Dodds Coal Mine	Dodds	Tofield.
Dunbar, J. & Partners	Hinton Trail	Halcourt.
Easton, James	Castor	Castor.
East Carbon Coal Co.	Carbon	Carbon.
East Trochu Coal Mine	Trochu	Carbon.
Edmonton Collieries Ltd.	Edmonton	Edmonton.
Egg Lake Coal Co.	Morinville	Edmonton.
Empire Collieries Ltd.	East Coulee	Drumheller.
Falvo, D.	Dodds	Tofield.
Forsyth & Arnold	Lethbridge	Lethbridge.
Foye, E. B.	Drumheller	Drumheller.
Fraser, Alec	Carmanagay	Champion.
Geddes, Wm.	Little Plume	Pakowiki.
Gill, Peter	Thorsby	Wetaskiwin.
Great West Coal Co.	10117—100A St. Edmonton	Edmonton.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
ALBERTA—Continued		
<i>Lignite—Continued</i>		
Gunderson Brick & Coal Co. Ltd.	Redcliff	District—
Guincy, C. J.	Rosebud	Redcliff.
Gwilliam, D. J.	Namoo	Gleichen.
Haden, J.	Castor	Edmonton.
Hamilton Coal Co., J. J.	Lethbridge	Castor.
Hamilton, John	Delia	Lethbridge.
Hanson, C. H.	Rosalind	Drumheller.
Herbaut, A.	Champion	Castor.
Howorth & Fraser	Halcourt	Champion.
Hronek, Ben	Halkirk	Halcourt.
Hy-Grade Coal Mining Co. Ltd.	Drumheller	Castor.
Johnson, Alex	Ardley	Drumheller.
Ideal Coal Co. Ltd.	Wayne	Ardley.
Ironside Bros.	Scapa, R.R. 2	Drumheller.
Jones & Son	Forestburg	Sheerness.
Kehl & McGladrie	Nevis	Castor.
Kent Coal Co. Ltd.	Edmonton	Ardley.
Kerralta Coal Co.	Lethbridge	Edmonton.
Kleenbain Collieries Ltd.	Eyzemore	Lethbridge.
K. M. Coal Mine	Forestburg	Brooks.
Kurp, Carl	Delbourne	Castor.
Lakeside Coals Ltd.	Edmonton	Ardley.
Lavenne, C.	Bow Island	Pembina.
Le Gear, Max	Forestburg	Taber.
Lethbridge Collieries Ltd.	Lethbridge	Castor.
Lien, E.	Edberg	Lethbridge.
Litke Bros.	Hanna	Castor.
Long Coal Co.	Namoo	Sheerness.
Lyness, John	Delburne	Edmonton.
Majestic Mines Ltd.	Taber	Ardley.
Mages, G.	Barnwell	Taber.
Maple Leaf Minerals Ltd.	Drumheller	Drumheller.
Marshall & Heisz Coal Co.	Donalda	Castor.
Masciangelo, John	Delia	Sheerness.
Max, John	S. Edmonton	Edmonton.
McGaw, A. M. S.	Champion	Champion.
McKinlay & Son, James	Huxley	Big Valley.
McMillan, Alex.	Rosebud	Gleichen.
Meek, F. G.	Heisler	Castor.
Midland Coal Mining Co. Ltd.	Drumheller	Drumheller.
Mills & Sons, J. J.	Heisler	Castor.
Minute Coal Co.	Drumheller	Drumheller.
Mitchinson, Thomas	Donalda	Castor.
Molzan, Henry	S. Edmonton	Edmonton.
Monarch Coal Mining Co. Ltd.	Drumheller	Drumheller.
Mueller, J. J.	Masinasin	Milk River.
Munex, H. C.	Foreman	Castor.
Newcastle Collieries Ltd.	Drumheller	Drumheller.
Nimko, K.	S. Edmonton	Edmonton.
North Point Coal Co.	Thorhild	Rochester.
Nottal & Davidson	Three Hills	Carbon.
O'Brien, A.	Halkirk	Castor.
Oliver, E.	Taber	Taber.
Onalinski & Sinoski	S. Edmonton	Edmonton.
Ottwell Coal Co.	Clover Bar	Edmonton.
Pahl, Fred M.	Hanna	Sheerness.
Pastorek & Partners	Three Hills	Carbon.
Peaceless Coal Co.	Carbon	Carbon.
Pembina Collieries Ltd.	Entwistle	Pembina.
Phillips, W. T.	Castor	Castor.
Pickering, B.	Beynon	Drumheller.
Popevitch, M.	Champion	Champion.
Proskow, Jos.	Dinant	Camrose.
Red Deer Valley Coal Co. Ltd.	Drumheller	Drumheller.
Red Flame Coal Co. Ltd.	Round Hill	Camrose.
Red Hot Coal Co. Ltd.	Edmonton	Edmonton.
Raeder, W.	Elkwater	Pakowki.
Remillard, O. V.	Castor	Castor.
Riddick & Horkulak	S. Edmonton	Edmonton.
Riverdale Coal Co. Ltd.	Edmonton	Edmonton.
Robinson, W.	Entwistle	Pembina.
Robinson, George	Lethbridge	Lethbridge.
Rosedale Collieries Ltd.	Aerial	Drumheller.
Rosedale Collieries Ltd.	Rosedale	Drumheller.
Rozzolini & Bridarolli	Magrath	Lethbridge.
Russell, Chas. O.	Alix	Ardley.
Ryley Coal Mine	Ryley	Tofield.
Ryning, Jas. W.	Rowley	Carbon.
Sanis, K. E.	Namoo	Edmonton.
Sank, John	Heisler	Castor.
Schlender, Otto	Trochu	Carbon.
Schnepf, Karl	Rosebud	Gleichen.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
ALBERTA—Continued		
Lignite—Concluded		District—
Shaw, Mrs. Dan.....	Castor.....	Castor.
Sheerness Coal Co. Ltd.....	Sheerness.....	Sheerness.
Shute & Partners.....	Dinant.....	Camrose.
Sinoski, Mike.....	S. Edmonton.....	Edmonton.
Sissons, J. W.....	Alix.....	Ardley.
Smith, Howard.....	Edmonton.....	Edmonton.
Sovereign Coal Co. Ltd.....	Wayne.....	Drumheller.
Spencer & Dolphin.....	Carbon.....	Carbon.
Standard Coal Mine.....	Standard.....	Gleichen.
Stoney Creek Collieries Ltd.....	Camrose.....	Camrose.
Strader, Chas.....	Halkirk.....	Castor.
Straub, F. A.....	Alix.....	Ardley.
Strlechuk, Leo.....	R.R. 2, Ohaton.....	Camrose.
Strickland & Tennant.....	Lethbridge.....	Lethbridge.
Stubbs, T. E.....	Hanna.....	Sheerness.
Taylor, Thomas.....	Groton.....	Milk River.
Thorhild Coal Co.....	Thorhild.....	Rochester.
Tofield Coal Co. Ltd.....	Tofield.....	Tofield.
Tollestrup, G. F.....	Lethbridge.....	Lethbridge.
Tyrlík, John.....	Heisler.....	Castor.
Watson, Alex.....	Blue Ridge.....	Whitecourt.
Western Gem & Jewel Collieries Ltd.....	Rosedale.....	Drumheller.
Whittaker, O. W.....	Beynon.....	Drumheller.
Wilkinson, Frank.....	Donalda.....	Castor.
Wilma Coal Co.....	Edmonton.....	Pembina.
Wiltse, F. N.....	Halkirk.....	Castor.
Wood & Larson.....	High Prairie.....	No Area.
Wright, H. H.....	Gensee.....	Pembina.
BRITISH COLUMBIA—		
Bulkley Valley Collieries Ltd.....	Telkwa.....	Inland.
Canadian Collieries (Dunsmuir) Ltd.....	Nanaimo.....	Island.
Cassidy Mines.....	Nanaimo.....	Island.
Chambers, R. H.....	Nanaimo.....	Island.
Consolidated Mg. & Smelting Co. Ltd.....	Trail.....	Crows' Nest Pass.
Crow's Nest Pass Coal Co. Ltd.....	Fernie.....	" " "
Deer Home Mine.....	Extension.....	Island.
Gething Coal Mine.....	Hudson Hope.....	Inland.
Granby Cons. M.S. & P. Co. Ltd.....	Princeton.....	Inland.
Hat Creek Coal Mines.....	Ashcroft.....	Inland.
Inland Collieries Ltd.....	Princeton.....	Inland.
Johnston, Carl Emil.....	Cottonwood.....	Inland.
Frater, George.....	Nanaimo.....	Island.
Lewis Mine.....	Nanaimo.....	Island.
Loudon, W. D.....	Wellington.....	Island.
Merritt Coal Mines Ltd.....	Merritt.....	Inland.
Middlesboro Collieries Ltd.....	Merritt.....	Inland.
Packwood Mine.....	Fort St. John.....	Inland.
Pacific Coal Mine.....	Nanaimo.....	Island.
Princeton Tulameen Coal Co. Ltd.....	Princeton.....	Inland.
Stronach Mine.....	Wellington.....	Island.
Telkoal Co. Ltd.....	Telkwa.....	Inland.
Tulameen Collieries Ltd.....	Vancouver.....	Inland.
Wellington No. 9 Coal Mine.....	Nanaimo.....	Island.

The Natural Gas Industry

NOTE.—(a) Drilling only.

(b) Distributing only.

(c) Producing wells drilled in 1943—no output reported.

(d) Dry wells drilled in 1943.

(e) Drilling and producing.

(f) Pipe line company.

(g) Using or selling gas from absorption plant.

Name	Address	Location—Field
NEW BRUNSWICK—		
(b) Moncton Electricity & Gas Co.....	700 Main St., Moncton.....	Stoney Creek.
New Brunswick Gas & Oilfields Ltd.....	Box 194, Moncton.....	
ONTARIO—		
Achilles Oil & Gas Syndicate.....	67 Yonge St., Toronto.....	Senaca, Woodhouse. and S. Cayuga.
(e) Ajax Oil & Gas Co. Ltd.....	371 Bay St., Toronto.....	Dover, Tuscarora, and Middleton.
Aloka Oil Co. Ltd.....	57 Queen St. W., Toronto.....	Dereham and Malahide.
Amer-Can. Oil & Gas Co.....	Chatham.....	Dover, Walpole, Tilbury, and Windham.

DIRECTORY OF FIRMS—Continued

The Natural Gas Industry—Continued

Name	Address	Location—Field
ONTARIO—Continued		
(a) Ashton, J. L.	550 King St. W., Chatham	Bertie.
Barnhart, Mrs. E.	Stevensville.	Humberstone.
Bates, Norman	Humberstone.	Walpole.
Beacon Natural Gas Syndicate	112 Locust St. Kitchener	Walpole.
Beaver Oil & Gas Syndicate	67 Yonge St., Toronto	Walpole.
(b) Beaver Utilities	70 Richmond St. W., Toronto	Binbrook.
Beer, George	Binbrook	Binbrook.
(b) Belmont Gas Co.	978 Church St., Windsor	Rainham.
Benn, A. S.	Hagersville	Walpole.
Benner, K. W.	Fisherville	Binbrook.
Bertie Tp. Gas & Oil Syndicate	Fisherville	Bertie and Willoughby.
Binbrook Gas Co.	Binbrook	Binbrook.
Bliss, Douglas E.	1312 Maxine St., Flint, Mich., U.S.A.	Middleton.
Brindley & Harper	Bradford, Pa., U.S.A.	Brantford.
Broadway Gas Syndicate	Cayuga	Walpole.
Buck, C.S.	Port Rowan	South Walsingham.
Burchell Natural Gas & Oil Syndicate	R.R. 2 Listowel	Woodhouse and Raleigh.
Canada Cement Co. Ltd.	Box 290, Station B., Montral, Quebec	Wainfleet.
Canadian Natural Gas Syndicate	Simcoe	Moulton and Bayham.
Canby, B. F.	Wainfleet	Wainfleet.
Canfield Gas Syndicate	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
Canfield Natural Gas Co. Ltd.	Canfield	Cayuga North.
Cartwright, S. E.	1972 Penobscot Bldg., Detroit, Mich., U.S.A.	Walpole.
Central Pipe Line Co. Ltd.	Chatham	Bayham, Houghton, Middleton, Dereham and Malahide.
Central Senaca Gas Syndicate	Cayuga	Senaca.
(b) City Gas Company of London	215 Dundas St., London	Walpole.
Colbert, Chas. T.	26 Sun Life Bldg., Hamilton	Gainsboro.
Coleman, J. A.	Wellandport	Dunn.
Columbia Natural Gas Co. Ltd.	515 Pigott Bldg., Hamilton	Rainham.
Comins, H. M.	Flint, Mich., U.S.A.	Bayham.
Connor & McKechnie	Dunnville	Bertie.
Coronation Gas Syndicate	Stevensville	Humberstone and Bertie.
Dain City Gas Syndicate	208 Burgar St., Welland	Tilbury East.
Dawson, Ralph	Merlin	Middleton and Bayham.
Dean Gas Syndicate	Fisherville	Windham.
Delhi Gas Syndicate	Cayuga	Oneida, Walpole, Rainham and Walsingham South.
Dereham Gas & Oil Co. Ltd.	97 Yonge St., Toronto	Moulton.
Diamond Gas Syndicate	Dunnville	Senaca, Oneida and Moulton.
Domestic Gas & Oil Co. Ltd.	Blyth	Binbrook, Caistor, Canbora, Charlotteville, Dereham, Delhi Village, Dunn, Glanford, Humberstone, Mersea, Middleton, Moulton, North Cayuga, North Walsingham, Oneida, Onondaga, Port Dover Village, Port Rowan, Rainham, Raleigh, Romney, Senaca, Sherbrooke, South Cayuga, South Walsingham, Tilbury East, Townsend, Wainfleet, Walpole, Winham, and Woodhouse.
Dorset Oil & Gas Syndicate	67 Yonge St., Toronto	Cayuga South.
Dunn Natural Gas Co. Ltd.	81 St. Paul St., St. Catharines	Dunn and Sherbrooke.
Dunnville-Detroit Gas Syndicate	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Cayuga North.
Economy Natural Gas Syndicate	Stratford	Woodhouse.
Elgin Prospecting Syndicate	Ridgeway	Humberstone.
Elk Development Syndicate	Cayuga	Humberstone.
Emerald Gas Syndicate	67 Yonge St., Toronto	Oneida.
(e) Emerson, Harry L.	Dunnville	Moulton, Canbora, and Wainfleet.
(a) Evans, H. L.	Tillsonburg	Oneida.
Featherstone, Roy	Caledonia	Rainham.
Fisherville Gas Co.	Fisherville	Bertie.
Fleet Aircraft Ltd.	Fort Erie	
(b) Fonthill Ridgeville Gas Co. Ltd.	Box 511, Portland, Ind., U.S.A.	Bertie.
Frontier Gas Syndicate	Fisherville	
Gas Producers Co.	703 Capitol Park Bldg., Detroit, Mich., U.S.A.	Raleigh.
Gifford, Arthur & Son	Cayuga	Cayuga South.

DIRECTORY OF FIRMS—Continued

The Natural Gas Industry—Continued

Name	Address	Location—Field
ONTARIO—Continued		
Glenney, C. A.	Dunnville.	Canboro.
Grand River Gas & Oil Syndicate.	Canfield.	Cayuga North.
Grimsby Natural Gas Co. Ltd.	Grimsby.	Caistor, Gainsboro, and Canboro.
Haldimand Gas Syndicate.	Cayuga.	Rainham.
Haldimand Natural Gas Syndicate.	Stevensville.	Bertie.
Highbank Oil Ltd.	Chatham.	Raleigh.
Houk Syndicate.	Dunnville.	Moulton.
House, C. C.	Stevensville.	Bertie.
Ideal Gas Syndicate.	Fisherville.	Rainham.
(e) Jackson, Percy L.	Dunnville, Moulton and Walpole.	Canboro, Cayuga North.
Jackson & Graff Syndicate.	Dunnville.	Crowland.
(e) Jasperson, Bon.	Kingsville.	Gosfield South, and Romney.
Jenkins, Stanley S.	282 W. North St., Buffalo, N.Y., U.S.A.	Townsend and Bertie.
Kelly Gas & Oil Syndicate.	15 Drayton Ave., Toronto.	Rainham, and Walpole.
Kent Gas Syndicate.	922 Millwood Rd., Toronto.	Walpole.
(a) Kiser Bros.	Chatham.	
Lake Erie Gas Syndicate.	54 Hambly Ave., Toronto.	Rainham.
Lake Shore Gas & Oil Syndicate.	Stevensville.	Bertie.
(b) Leamington, Town of	Leamington.	
Lincoln National Gas Ltd.	Port Erie.	Canboro, Gainsboro, Caistor, Wainfleet, and Moulton.
Lindsay, W. B. Estate.	10126-100th St., Edmonton, Alta.	Walpole.
Little, R. W.	222 Humbercrest Blvd., Toronto.	Walpole, Rainham, Onondaga, and Barnt.
Locators Oils Ltd.	22 King St. W., Toronto 1.	Middleton, and Cayuga South
Lomac Gas & Oil Co. Ltd.	Port Stanley.	Bayham.
(e) Lymburner Bros. & Webber	Dunnville.	Rainham, Walpole and Cayuga North.
(a) McCutcheon, T.	225 Broad St., Dunnville.	
(e) McKechnie, S.	Dunnville.	Senaca, Bayham, and Walpole.
(a) McLister, G. G.	Dunnville.	
Mehlenbacher, L. B.	Cayuga.	Senaca, Walpole and Cayuga North.
Midfield Gas Corp. Ltd.	68 Yonge St., Toronto.	Cayuga North and Oneida.
Minor, Irene C.	Cheltenham.	Sherbrooke.
Mohawk Gas & Oil Co. Ltd.	421 Main St., Hamilton.	Canboro, Oneida, and Walpole.
Monarch Gas & Oil Syndicate.	Fisherville.	Walpole.
Morningstar, Roy.	Stevensville.	Bertie.
New Eden Natural Gas Co. Ltd.	Tillsonburg.	Bayham.
New Tillsonburg Oil & Gas Co. Ltd.	26 Adelaide St. W., Toronto.	Middleton.
Niagara Gas Syndicate.	Fisherville.	Bertie.
Niagara Natural Gas Co. Ltd.	Fort Erie.	Moulton.
Neese, Elmond.	Lowbanks.	Sherbrooke.
(b) Norotto Gas Co. Ltd.	Norwich.	
North Cayuga Gas Syndicate.	231 Rawson Rd., Brookline, Mass., U.S.A.	Cayuga North.
North Shore Gas Co.	Selkirk.	Rainham.
Noves, L. A.	Stevensville.	Willoughby.
(b) Oil Springs Oil & Gas Co. Ltd.	Oil Springs.	
(b) (f) Oxford Pipe Line Co. Ltd.	100 Adelaide St. W., Toronto.	
Palmer, Jas.	Wainfleet.	Wainfleet.
(e) Patterson, W. C. Gas Co. Ltd.	Jamestown, N.Y., U.S.A.	Dunn, Walpole, Willoughby, Rainham, Cayuga North Crowland, Humberstone, Bayham, Dereham and Wainfleet.
(a) Patterson & Culver	Dunnville.	
Peacock Paint, Gas & Oil Syndicate.	Fisherville.	Walpole.
Petrol Oil & Gas Co. Ltd.	414 Bay St., Toronto.	Dover, Oneida, Onondaga and Tuscarora.
Pine Ridge Gas Co. Ltd.	Port Stanley.	Bayham.
(e) Port Colborne-Welland Gas Co.	Port Colborne.	Onondaga Senaca, Oneida, and Cayuga North.
Povee Gas Syndicate.	Tillsonburg.	Cansboro and Mersea.
Prairie Gas & Oil Co. Ltd.	350 Bay St. Toronto.	Dover and Raleigh.
Provincial Gas Co. Ltd.	Fort Erie N.	Humberstone, Willoughby, Bertie and Crowland.
Rainham Gas Syndicate.	Cayuga.	Rainham.
Reicheld, F. W.	Jarvis.	Walpole.
Ricker, Arthur.	Canboro.	Canboro.
Riley, J. V.	162 Talbot St., Simcoe.	Moulton.
Romney Oil & Gas Co.	15 Toronto St., Toronto.	Tilbury E., Romney and Wainfleet.
Rossmore Exploration Ltd.	80 Richmond St. W., Toronto.	Oneida and Cayuga N.
(e) Roth, F. & H.	R.R. 9, Dunnville.	Bertie and Dunn.

DIRECTORY OF FIRMS—Continued

The Natural Gas Industry—Continued

Name	Address	Location—Field
ONTARIO—Continued		
Rowe, E. P., Estate of.....	350 Bay St., Toronto.....	Dover, Bayham, and Middleton.
Royal Gas Syndicate.....	Stevensville.....	Bertie.
Salina Gas Co. Ltd.....	Chatham.....	Tilbury East.
Sandusk Gas Syndicate.....	Fisherville.....	Walpole.
Sarnia Oil & Gas Co. Ltd.....	350 Bay St., Toronto.....	Enniskillen and Sarnia.
(n) Shank Bros.....	R. R. 2, Selkirk.....	
Sherk & Carruthers.....	Sherkston.....	Humberstone.
Sherk & Learn.....	Sherkston.....	Humberstone.
Sherk, Perry M.....	Sherkston.....	Humberstone.
Sherk, Bert & Nagel.....	Stevensville.....	Bertie.
Shurr & Shank.....	R. R. 1, Jarvis.....	Oneida and Rainham.
Sider, Andrew & Jesse.....	Stevensville.....	Bertie.
Sider, Norman.....	Sherkston.....	Bertie and Humberstone.
(e) Smith & Ehde.....	Lowbanks.....	Moulton.
South Norwich Gas & Oil Syndicate.....	Norwich.....	Norwich South.
Springvale Gas & Oil Co. Ltd.....	Hagersville.....	Walpole.
(e) Standard Gas & Oil Syndicate.....	Fisherville.....	Rainham and Walpole.
Stanley Gas Syndicate.....	922 Millwood Rd., Toronto.....	Walpole, Rainham and Sherbrooke.
Star Gas Syndicate.....	Ridgeway.....	Bertie.
Sterling Gas Co.....	5 Quebec St., Guelph.....	Walpole.
Stevensville Natural Gas & Fuel Co.....	Stevensville.....	Bertie.
Stewart & Stewart.....	R. R. 3, Jarvis.....	Walpole.
Storm & Stewart.....	R. R. 1, Sherkston.....	Humberstone.
(e) Stover & Rawlings.....	19 Beatty St., Chatham.....	Dover and Raleigh.
Stromwell Syndicate.....	Tillsonburg.....	Moulton.
(a) Stubble, H. H.....	Chatham.....	
Sundy Gas Wells.....	Dunnville.....	Canboro.
Superior Gas Syndicate.....	Fisherville.....	Rainham.
Sweets Corners Gas Syndicate.....	Fisherville.....	Rainham.
(a) Swent, Wm. Norman.....	Selkirk.....	
Tanner, J. O.....	General Motors Bldg., Detroit, Mich., U.S.A.	Cayuga North and Oneida.
Till Gas Syndicate.....	Tillsonburg.....	Walpole.
Union Gas Co. of Canada Ltd.....	Chatham.....	Romney, Tilbury East, Raleigh, Dover, Dawn, (d) Sombra, Camden Gore, (d) Zone, Canboro, Dunn, Cayuga North, Rainham, Seneca, Cayuga South, Walpole, Woodhouse, Oneida, Chatham, Mahahide, (d) Delaware and (d) Westminster.
(b) United Gas & Fuel Co. of Hamilton Ltd.....	82-84 King St. E., Hamilton.....	
Victoria Gas Co.....	Dunnville.....	Rainham and Walpole
Victory Oil & Gas Co.....	510 Huron & Erie Bldg., London.....	Windham.
Wainfleet Gas Co. Ltd.....	Box 914, Jamestown, N.Y., U.S.A.....	Wainfleet.
Walpole Gas Syndicate.....	Cayuga.....	Walpole, Port Rowan and Walsingham South.
(e) Walter Gas Syndicate Ltd.....	Simcoe.....	Townsend, Woodhouse, Walsingham South, Walpole and Middleton.
Welland County Gas Syndicate.....	Stevensville.....	Bertie.
(b) Wentworth Gas Co. Ltd.....	82-84 King St. E., Hamilton.....	
West Petroleum Ltd.....	372 Bay St., Toronto.....	Romney.
Western Ontario Natural Gas Co. Ltd.....	81 St. Paul St., St. Catharines.....	Canboro, Cayuga North Dunn, Bayham, and Dereham.
(a) Willits, Geo. E.....	Bothwell.....	
Willoughby Gas Syndicate.....	R. R. 1, Chippawa.....	Humberstone.
SASKATCHEWAN—		
Lloydminster Gas Co. Ltd.....	Lloydminster.....	Lloydminster.
Northern Utilities Ltd.....	Lloydminster.....	Lloydminster.
ALBERTA—		
Ace Royalties Ltd.....	4 Clarence Block, 122, 8th Ave. W., Calgary.....	Turner Valley
Advance Oil Co. Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Alberta Clay Products Co. Ltd.....	Medicine Hat.....	Medicine Hat.
Alberta Oil Incomes Ltd.....	301 Lancaster Bldg., Calgary.....	Turner Valley.
Alberta Pacific Royalties Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Allied Royalties Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Amalgamated Oils Ltd.....	Lancaster Bldg., Calgary.....	Turner Valley.
Anglo Canadian Oil Co. Ltd.....	Lancaster Bldg., Calgary.....	Turner Valley.
Argus Royalties Ltd.....	Lancaster Bldg., Calgary.....	Turner Valley.
Arrow Oil Royalties Ltd.....	804 Southam Bldg., Calgary.....	Turner Valley.
Associated Oil & Gas Co. Ltd.....	290 Leeson-Lineham Block, Calgary.....	Turner Valley.
B. & B. Royalties Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Baltac Oils Ltd.....	200 Leeson-Lineham Block, Calgary.....	Turner Valley.
Barsac Royalties Ltd.....	303 Toronto General Trusts Bldg., Calgary.....	Turner Valley.

DIRECTORY OF FIRMS—Continued

The Natural Gas Industry—Continued

Name	Address	Location—Field
ALBERTA—Continued		
(b) Bow Island, Town of.....	Bow Island.....	
(g) British American Oil Co. Ltd.....	Royal Bank Bldg., King and Yonge Sts., Toronto.....	
British Colonial Oils Ltd.....	1010 Lancaster Bldg., Calgary.....	Turner Valley.
British Dominion Oil & Development Corp. Ltd.....	213-216 Dominion Bank Bldg., Calgary.....	Turner Valley.
Brown Oil Corp Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Calgary Power Co. Ltd.....	244 St. James St., Montreal, Que.....	Bassano.
Calmont Oils Ltd.....	303 Toronto General Trusts Bldg., Calgary.....	Turner Valley.
Canadian Pacific Railway Co.....	Medicine Hat.....	Medicine Hat.
Canadian Western Natural Gas, Light, Heat & Power Co. Ltd.....	215-6th Ave. W., Calgary.....	Brooks.
Canadian Western Power & Fuel Co. Ltd.....	Third St., Redcliff.....	Redcliff.
Chinook Oils Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Crude Oils Ltd.....	No. 1 Imperial Bank Chambers, Calgary.....	Turner Valley.
D. & D. Royalties Ltd.....	303 Toronto General Trusts Bldg., Calgary.....	Turner Valley.
Davies Petroleum Ltd.....	409 Lancaster Bldg., Calgary.....	Turner Valley.
Deep Oils Ltd.....	1 Imperial Bank Chambers, Calgary.....	Turner Valley.
Department of National Defence.....	Traders Bldg., Calgary.....	Suffield.
Dominion Glass Co. Ltd.....	1111 Beaver Hall Hill, Montreal, Que.....	Redcliff.
Drillers & Producers Ltd.....	304 Toronto General Trusts Bldg., Calgary.....	Turner Valley.
East Crest Oil Co. Ltd.....	212 Grain Exchange Bldg., Calgary.....	Turner Valley.
Extension Oil Royalties Ltd.....	Lancaster Bldg., Calgary.....	Turner Valley.
Federated Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Foothills Oil & Gas Co. Ltd.....	606 Second St. W., Calgary.....	Turner Valley.
Four Star Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Franco Oils Ltd.....	Vermilion.....	Vermilion.
(g) Gas & Oil Refineries Ltd.....	301 Lancaster Bldg., Calgary.....	
Gunderson Brick & Coal Co. Ltd.....	Redcliff.....	Redcliff.
Harris Wells Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Highwood-Sarcee Oils Ltd.....	614 Lancaster Bldg., Calgary.....	Turner Valley.
Home Oil Co. Ltd.....	226 Lougheed Bldg., Calgary.....	Turner Valley.
Hudson's Bay Oil & Gas Co. Ltd.....	79 Main St., Winnipeg, Man.....	Viking.
Kamalta, Well Operators Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Majal Oil Investments Ltd.....	407 Lancaster Bldg., Calgary.....	Turner Valley.
Maple Leaf Oil Co. Ltd.....	608 Stock Exchange Bldg., Vancouver, B.C.....	Wainwright.
Medicine Hat Brick & Tile Co. Ltd.....	Medicine Hat.....	Medicine Hat.
Medicine Hat, City of.....	Medicine Hat.....	Medicine Hat.
Model Oils Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
National Petroleum Corp.....	401 Leeson-Lineham Bldg., Calgary.....	Turner Valley.
Northwestern Utilities Ltd.....	10124-104 St., Edmonton.....	Viking.
Ogilvie Flour Mills Co. Ltd.....	Medicine Hat.....	Medicine Hat.
Oil Ventures Ltd.....	No. 1 Imperial Bank Chambers, Calgary.....	Turner Valley.
Pacific Petroleum Ltd.....	1 Imperial Bank Chambers, Calgary.....	Turner Valley.
Renown Royalties Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Reward Spooner Model.....	717 Lancaster Bldg., Calgary.....	Turner Valley.
Royal Crest Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Royalite Oil Co. Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Royalite-Model No. 1 Well.....	201 Lancaster Bldg., Calgary.....	Turner Valley.
Share Royalties Ltd.....	61 Canada Life Bldg., Calgary.....	Turner Valley.
Shaw, R. L.....	Lloydminster, Sask.....	Lloydminster.
Southwest Petroleum Co. Ltd.....	606-2nd St. W., Calgary.....	Turner Valley.
Sunset Oils Ltd.....	302 Toronto General Trusts Bldg., Calgary.....	Turner Valley.
Three Point Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Trail Oils Ltd.....	1 Imperial Bank Chambers, Calgary.....	Turner Valley.
Turner Valley Royalties Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Twin Valley Oil Royalties Ltd.....	804 Southam Bldg., Calgary.....	Turner Valley.
United Assets Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Yamale Ltd.....	Granville Island, Vancouver, B.C.....	Red Coulee.
Vancken-Brown Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
(b) Wainwright Gas Co. Ltd.....	36 Dominion Bank Bldg., Edmonton.....	
Welch, Miss Nora.....	Suffield.....	Medicine Hat.
Westside Royalties Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Wetaskiwin, City of.....	Wetaskiwin.....	Wetaskiwin.
York Oils Ltd.....	501 Leeson-Lineham Block, Calgary.....	Turner Valley.
NORTHWEST TERRITORIES—		
Imperial Oil Ltd. (Canol Project).....	10152-101st St., Edmonton, Alta.....	Fort Norman.
Imperial Oil Ltd.....	56 Church St., Toronto, Ont.....	Fort Norman.

DIRECTORY OF FIRMS—Continued

The Crude Petroleum Industry

(x) Producers of 300 barrels or more during the year.

(a) Drillers only.

(b) Producer and driller.

(c) Drilling only.

(d) Operates an absorption plant.

(e) In addition to operating and drilling wells in the Turner Valley field, this company operates two absorption plants.

Name	Address	Location—Field
NEW BRUNSWICK— New Brunswick Gas & Oilfields Ltd.....	Moncton.....	Stoney Creek.
ONTARIO (x)— Barnes, Amos G.....	Petrolia.....	Petrolia and Enniskillen.
Barnes, Henry.....	Oil Springs.....	Petrolia and Enniskillen.
Beattie Bros.....	Glencoe.....	Metcalfe.
Brock, Thomas A.....	Petrolia.....	Petrolia and Enniskillen.
Campbell, John L., Estate of.....	10 Hume St., London.....	Petrolia and Enniskillen.
Canadian Oil Companies Ltd.....	Terminal Bldg., Toronto.....	Petrolia and Enniskillen.
Cole, W. J.....	Petrolia.....	Petrolia and Enniskillen.
Collins, Matthew.....	Petrolia.....	Petrolia and Enniskillen.
Corey, Harrison.....	Petrolia.....	Petrolia and Enniskillen.
Dennica, Charles, Estate of.....	Oil Springs.....	Oil Springs.
Domestic Gas & Oil Co. Ltd.....	Blyth.....	Bothwell.
Dominion Petroleum Co. Ltd.....	Bank of Montreal Bldg., London.....	Mosa.
Donald, George.....	Oil Springs.....	Petrolia and Enniskillen.
Edward, F. H.....	Petrolia.....	Petrolia and Enniskillen.
Empire Royalties.....	c/o Eastern Trust Co., Toronto.....	Dunwich.
Fairbank, J. H., Estate of.....	Petrolia.....	Petrolia and Enniskillen.
Fitzpatrick, P. H.....	2230 Park Ave., Detroit, Mich., U.S.A.....	Orford.
Garinger, Arthur D.....	Oil Springs.....	Petrolia and Enniskillen.
Graft, G. I.....	25 Market Place, Stratford.....	Bothwell.
(a) Gregory, G. F. & Sons.....	Petrolia.....	
Hamlin, Frederick George.....	Petrolia.....	Petrolia and Enniskillen.
Heal, Andrew A.....	Watford.....	Warwick.
High Grade Natural Gas Co.....	215 King St. W.....	Dover.
Hillis Bros.....	Oil Springs.....	Petrolia and Enniskillen.
Holmes, E. B.....	Bothwell.....	Bothwell.
Houston, M. B.....	853 Hellmuth Ave., London.....	Petrolia and Enniskillen.
Howlett, Fred & Sons.....	Petrolia.....	Petrolia and Enniskillen.
(a) Hussey, W. J.....	Petrolia.....	
Jackson & Morningstar.....	Oil Springs.....	Petrolia and Enniskillen.
Kelly, Mrs. E.....	Petrolia.....	Petrolia and Enniskillen.
Kells, E. E.....	Petrolia.....	Petrolia and Enniskillen.
Kerr, John, Estate of.....	Petrolia.....	Petrolia and Enniskillen.
Lathur, Arthur.....	Bothwell.....	Orford.
Lennan, Lloyd.....	Petrolia.....	Petrolia and Enniskillen.
Leverton, Wm. & R. H. Buckenham.....	Bothwell.....	Bothwell.
Lewis, Laura & Wm.....	Oil Springs.....	Petrolia and Enniskillen.
Lidster, Geo. H. & Harold.....	Wallacetown.....	Dunwich.
Lotan, Percy.....	Bothwell.....	Bothwell.
MaeGillivray, Margaret.....	Oil Springs.....	Petrolia and Enniskillen.
Marcus, Andrew.....	Bothwell.....	Bothwell.
McCutcheon, A. P.....	Oil Springs.....	Petrolia and Enniskillen.
McGill, Joseph.....	Bothwell.....	Bothwell.
McMillan & Marwin.....	Bothwell.....	Bothwell.
McMillan & Warwick.....	Bothwell.....	Bothwell.
Mitchell, Charles.....	Oil Springs.....	Petrolia and Enniskillen.
Mitchell, Robt. W.....	Oil Springs.....	Petrolia and Enniskillen.
Morningstar, George E.....	Oil Springs.....	Petrolia and Enniskillen.
Morningstar, H. M.....	Oil Springs.....	Petrolia and Enniskillen.
Ontario Lands & Oil Co. Ltd.....	Petrolia.....	Petrolia and Enniskillen.
Petrol Oil & Gas Co. Ltd.....	414 Bay St., Toronto.....	Dover.
Pope, H. O.....	Bothwell.....	Bothwell.
Pope, Wm. Jr.....	Bothwell.....	Thamesville.
Prairie Gas & Oil Co. Ltd.....	350 Bay St., Toronto.....	Dover and Raleigh.
Rawson, W. J.....	Petrolia.....	Petrolia and Enniskillen.
Rowe, E. P., Estate of.....	350 Bay St., Toronto.....	Dover East and Raleigh.
Saroline Oil Co. Ltd.....	Petrolia.....	Petrolia and Enniskillen.
Shain, Viola M.....	Petrolia.....	Petrolia and Enniskillen.
Slack, C. M.....	Petrolia.....	Petrolia and Enniskillen.
Sutherland, B. M.....	Petrolia.....	Petrolia and Enniskillen.
Thompson, Arnold.....	Petrolia.....	Petrolia and Enniskillen.
Tunks, James.....	Bothwell.....	Bothwell.
Union Gas Co. of Canada Ltd.....	Chatham.....	Dawn.
Warwick, Joseph.....	Oil Springs.....	Petrolia and Enniskillen.
(b) Wilson-Sullivan Development Co.....	Sarnia.....	Warwick.
Winnett, J. W. G.....	418 Talbot St., London.....	Bothwell and Warwick.
Woodward, Wm.....	Oil Springs.....	Petrolia and Enniskillen.
Yerke, Frank.....	Petrolia.....	Petrolia and Enniskillen, and Warwick.
ALBERTA— Ace Royalties Ltd.....	4 Clarence Block, 122 8th Ave. W., Calgary.....	Turner Valley.
Advance Oil Co. Ltd.....	232 Loughheed Bldg., Calgary.....	Turner Valley.
Alberta Oil Incomes Ltd.....	301 Lancaster Bldg., Calgary.....	Turner Valley.
Alberta Pacific Royalties Ltd.....	201 Lancaster Bldg., Calgary.....	Turner Valley.

DIRECTORY OF FIRMS—Continued

The Crude Petroleum Industry—Continued

Name	Address	Location—Field
ALBERTA—Continued		
Allied Royalties Ltd.	201 Lancaster Bldg., Calgary	Turner Valley.
Amalgamated Oils Ltd.	Lancaster Bldg., Calgary	Turner Valley.
Anglo-Canadian Oil Co. Ltd.	Lancaster Bldg., Calgary	Turner Valley.
Argus Royalties Ltd.	Lancaster Bldg., Calgary	Turner Valley.
Arrow Oil Royalties Ltd.	804 Southam Bldg., Calgary	Turner Valley.
Associated Oil & Gas Co. Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
B. & B. Royalties Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
Baltac Oils Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley.
Barsac Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary	Turner Valley.
Bethwain Oils Ltd.	73 Adelaide St., W. Toronto, Ont.	Wainwright.
Borradaile Oils Ltd.	330 Bay St., Toronto, Ont.	Wainwright.
(d) British American Oil Co. Ltd.	Royal Bank Bldg., King and Yonge Sts., Toronto	Vermilion.
British Colonial Oils Ltd.	1010 Lancaster Bldg., Calgary	Turner Valley.
British Dominion Oil and Development Corp. Ltd.	213-216 Dominion Bank Bldg., Calgary	Turner Valley.
Brown Oil Corp Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
Calmont Oils Ltd.	303 Toronto General Trusts Bldg., Calgary	Turner Valley.
Calvin Royalties Ltd.	301 Lancaster Bldg., Calgary	Turner Valley.
Cannar Oils Ltd.	355 McGill St., Montreal, Que.	Vermilion.
Chinook Oils Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
Command Oils Ltd.	4 Clarence Bldg., 122-8th Ave. W., Calgary	Turner Valley.
Commoil Ltd.	4 Clarence Bldg., 122-8th Ave. W., Calgary	Turner Valley.
(c) Commonwealth Drilling Co. Ltd.	4 Clarence Bldg., 122-8th Ave. W., Calgary	Vermilion.
Conestoga Resources Ltd.	710 Excelsior Life Bldg., Toronto, Ont.	Vermilion.
Crude Oils Ltd.	1 Imperial Bank Chambers, Calgary	Turner Valley.
D. & D. Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary	Turner Valley.
Dalhousie Oil Co. Ltd.	606 Second St. W., Calgary	Turner Valley.
Davies Petroleum Ltd. (N.P.L.)	409 Lancaster Bldg., Calgary	Turner Valley.
De Koch, Wm. G.	Vermilion	Vermilion.
Deep Oils Ltd.	1 Imperial Bank Chambers, Calgary	Turner Valley.
Dina Oil & Refining Co. Ltd.	Lloydminster	Dina.
Director Royalties Ltd.	600 Lancaster Bldg., Calgary	Turner Valley.
Dominion Oil Co. Ltd.	906 Marine Bldg., Vancouver, B.C.	Taber.
Drillers & Producers Ltd.	304 Toronto General Trusts Bldg., Calgary	Turner Valley.
East Crest Oil Co. Ltd.	212 Grain Exchange Bldg., Calgary	Turner Valley.
Edmonton Wainwright Oils Ltd.	8 McDougal Court, Edmonton	Wainwright.
Extension Oil Royalties Ltd.	Lancaster Bldg., Calgary	Turner Valley.
Federated Petroleum Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
Foothills Oil & Gas Co. Ltd.	606 Second St. W., Calgary	Turner Valley.
Four Star Petroleum Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
Franco Oils Ltd.	Vermilion	Vermilion.
(d) Gas & Oil Refineries Ltd.	301 Lancaster Bldg., Calgary	Turner Valley.
Gem Royalties Ltd.	403 Lancaster Bldg., Calgary	Turner Valley.
Globe Royalties Ltd.	401 Leeson-Lineham Bldg., Calgary	Turner Valley.
Granville Oils Ltd.	4 Clarence Block, 122-8th Ave. W., Calgary	Turner Valley.
Harris Syndicate	201 Lancaster Bldg., Calgary	Turner Valley.
Highwood-Sarcee Oils Ltd.	614 Lancaster Bldg., Calgary	Turner Valley.
Hollingsworth Oils Ltd.	210 Toole Peet Bldg., Calgary	Vermilion.
Home Oil Co. Ltd.	226 Loughheed Bldg., Calgary	Turner Valley.
Imperial Oil Ltd.	56 Church St., Toronto, Ont.	Turner Valley.
Independent Royalties Ltd.	403 Lancaster Bldg., Calgary	Turner Valley.
Well Operators for Kamalta	201 Lancaster Bldg., Calgary	Turner Valley.
Majestic Mines Ltd.	Taber	Taber.
Major Oil Investments Ltd.	407 Lancaster Bldg., Calgary	Turner Valley.
McDougall-Segur Exploration Co. of Canada Ltd.	405-8th Ave. W., Calgary	Turner Valley.
Mercury Oils Ltd.	301 Lancaster Bldg., Calgary	Turner Valley.
Miracle Oils Ltd.	301 Lancaster Bldg., Calgary	Turner Valley.
Miracle Royalties Ltd.	301 Lancaster Bldg., Calgary	Turner Valley.
Model Oils Ltd.	201 Lancaster Bldg., Calgary	Turner Valley.
Model Spooner Syndicate	717 Lancaster Bldg., Calgary	Turner Valley.
Moose Oils Ltd.	714 Lancaster Bldg., Calgary	Moose Dome.
(c) National Drilling Co. Ltd.	401 Leeson-Lineham Bldg., Calgary	Turner Valley.
National Petroleum Corp. Ltd.	401 Leeson-Lineham Bldg., Calgary	Turner Valley.
National Vulcan Royalties Ltd.	401 Leeson-Lineham Bldg., Calgary	Turner Valley.
(c) Newell & Chandler Ltd.	304 Toronto General Trusts Bldg., Calgary	Turner Valley.
Oil Ventures Ltd.	1 Imperial Bank Chambers, Calgary	Turner Valley.
Okalta Oils Ltd.	Renfrew Bldg., Calgary	Turner Valley.
Pacific Oil & Refinery of Alberta Ltd.	Lethbridge	Del Bonita.
Pacific Petroleum Ltd.	1 Imperial Bank Chambers, Calgary	Turner Valley.
Princeville Petroleum Ltd.	475 Howe St., Vancouver, B.C.	Vermilion.
Regal Royalties Ltd.	401 Leeson-Lineham Bldg., Calgary	Turner Valley.
Renown Royalties Ltd.	201 Lancaster Bldg., Calgary	Turner Valley.
Reward Spooner Model.	717 Lancaster Bldg., Calgary	Turner Valley.
Royal Canadian Oils Ltd.	403 Lancaster Bldg., Calgary	Turner Valley.
Royal Crest Petroleum Ltd.	232 Loughheed Bldg., Calgary	Turner Valley.
(e) Royaltite Oil Co. Ltd.	606-2nd St. W., Calgary	Turner Valley.
Royaltite Model No. 1 Well	201 Lancaster Bldg., Calgary	Turner Valley.
Sasko-Wainwright Oil & Gas Ltd.	103 Bowerman Bldg., Saskatoon, Sask.	Wainwright.
Share Royalties Ltd.	61 Canada Life Bldg., Calgary	Turner Valley.
Shaw, R. L.	Lloydminster, Sask.	Lloydminster.
Southwest Petroleum Co. Ltd.	606-2nd St. W., Calgary	Turner Valley.

DIRECTORY OF FIRMS—Continued

The Crude Petroleum Industry—Concluded

Name	Address	Location—Field
ALBERTA—Continued		
Sovereign Royalties Ltd.....	317 Alberta Corner, Calgary.....	Turner Valley.
Standard Oil Co. of B.C. Ltd.....	906 Marine Bldg., Vancouver, B.C.....	Princess and Taber.
Sunburst Oil Co. Ltd.....	c/o Prudential Trust, 800 Lancaster Bldg., Calgary.....	Turner Valley.
Sunset Oils Ltd.....	302 Toronto General Trusts Bldg., Calgary..	Turner Valley.
Three Point Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Trail Oils Ltd.....	1 Imperial Bank Chambers, Calgary.....	Turner Valley.
Turner Valley Royalties Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Twin Valley Oil Royalties Ltd.....	804 Southam Bldg., Calgary.....	Turner Valley.
United Assets Ltd.....	Lougheed Bldg., Calgary.....	Turner Valley.
Vanalta Ltd.....	Granville Island, Vancouver, B.C.....	Red Coulee.
Vanpeg Royalties Ltd.....	301 Lancaster Bldg., Calgary.....	Turner Valley.
Vermilata-Frankview Gross Royalty Trust.	710 Excelsior Bldg., Toronto, Ont.....	Vermilion.
Vulcan Brown Petroleum Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Wain-Con Oils Ltd.....	431 Tegler Bldg., Edmonton.....	Wainwright.
Wainwright Petroleum Ltd.....	Bank of Toronto Bldg., Edmonton.....	Wainwright.
Westside Royalties Ltd.....	232 Lougheed Bldg., Calgary.....	Turner Valley.
Winalta Royalties Ltd.....	301 Lancaster Bldg., Calgary.....	Turner Valley.
York Oils Ltd.....	501 Leeson-Lineham Bldg., Calgary.....	Turner Valley.
NORTHWEST TERRITORIES—		
Imperial Oil Ltd. (Canol Project).....	10152-101st St., Edmonton, Alta.....	Fort Norman.
Imperial Oil Ltd.....	56 Church St., Toronto, Ont.....	Fort Norman.

OTHER NON-METAL MINING INDUSTRIES

DIRECTORY OF FIRMS—Continued

Asbestos Mining Industry

Name of firm	Head or general office address	Location
QUEBEC—		
Asbestos Corporation Ltd.....	Thetford Mines.....	Thetford Mines, Black Lake, Coleraine.
Bell Asbestos Mines Ltd.....	Thetford Mines.....	Thetford Tp.
Canadian Johns-Manville Co. Ltd.....	Sun Life Bldg., Montreal.....	Asbestos.
International Asbestos Co. Ltd. (x).....	66 Wellington St. N., Sherbrooke.....	St. Adrien de Ham.
Johnson's Company.....	Thetford Mines.....	Thetford Mines, Coleraine.
Nicolet Asbestos Mines Ltd.....	820 Transportation Bldg., Montreal.....	Norbestos.
Quebec Asbestos Corp. Ltd.....	East Broughton Station.....	East Broughton Sta.

(x) Carried on exploration or development work only.

The Feldspar and Quartz Mining Industry

- (a) Produces silica. (c) Operates a mill.
 (b) Produces feldspar. (d) Also produces kaolin.
 (e) Produces nepheline syenite.

NOVA SCOTIA—		
Nairn, J. (a).....	24 Whitney Ave., Sydney.....	Leitches Creek.
QUEBEC—		
Bigelow, Gordon (Derry mine) (a) (b).....	Glen Almond.....	Derry Tp.
Bonhomme, J. R. (a) (c).....	8661 Drolet, Montreal.....	Kilkenny Tp.
Cameron, U. P. (b).....	Buckingham.....	Buckingham district.
Canadian Carborundum Co. Ltd. (a) (c).....	Box 57, Niagara Falls, Ont.....	St. Canut.
Canada China Clay & Silica Ltd. (a) (c) (d).....	1600 Royal Bank Bldg., Toronto, Ont.....	D'Amherst Tp.
Canadian Flint & Spar Co. Ltd. (a) (b) (c).....	Room 512 Victoria Bldg., Ottawa, Ont.....	Buckingham
Gatineau Mining & Contracting Co. Ltd. (b).....	27 Dalhousie St., Montreal.....	Derry Tp.
Hill, Wm., Jr. (a).....	Glen Almond.....	Templeton Tp.
Lafrance, Ovila (a).....	Angers.....	Wakefield Tp.
Micaspar Industries Ltd. (b).....	16 James St. S., Hamilton, Ont.....	Buckingham Tp.
Morin, Henri A. (a) (b).....	Box 3, Buckingham.....	Buckingham Tp.
Montpetit, Euclýde (a).....	Melochville.....	Portland W. Tp.
Perkins Mining Co. (b).....	Gatineau Pointe.....	Buckingham Tp.
Parcher, A. (a).....	Buckingham.....	Melochville.
Range Prospecting Synd.....	Suite 28, 14 Toronto St., Toronto, Ont.....	Buckingham Tp.
United Mining Industries Ltd. (a) (b).....	1451 Notre Dame St. W., Montreal.....	Buckingham district.
Wallingford, W. M. (b).....	Gatineau Pointe.....	Buckingham district.
Warwick, Wm. (b).....	Glen Almond.....	Derry Tp.
		Buckingham Tp.
ONTARIO—		
American Nepheline Corp. (c) (e).....	Lakefield.....	Methuen Tp.
Bathurst Feldspar Mines Ltd. (a) (b).....	21 King St. E., Toronto.....	Bathurst Tp.
Frontenac Floor & Wall Tile Co. Ltd. (b).....	Box 178, Kingston.....	Bathurst Tp.
Dominion Mines & Quarries Ltd. (a) (c).....	Canada Life Bldg., Toronto.....	Kilarney.
Hamilton, Thos. J. (b).....	Box 86, Madawaska.....	Murchison Tp.
Keystone Contractors Ltd. (b).....	732 Langlois Ave., Windsor.....	Murchison Tp.
Kingston Silica Mines Ltd. (a) (c).....	R.R. 1, Kingston.....	Pittsburg Tp.
Madawaska Feldspar Co. (a) (b).....	275 St. James St. W., Montreal, Que.....	Murchison Tp.
Magnetawan Feldspar Mining Synd. (b).....	64 Kent Road, Toronto.....	Burton Tp.
Purdy Mica Mines Ltd. (b).....	Oak St. E. North Bay.....	Eau Claire.
Rare Minerals Prospecting Synd. (a).....	Wilson Bldg., Toronto.....	Gananoque.
Symington, J. B. (a).....	557 Queen St. E., Sault Ste. Marie.....	Bar River.
Verona Rock Products Ltd. (a) (b) (c).....	330 Bay St., Toronto.....	Frontenac Co.
Wright & Co. (a).....	960 Queen St., Sault Ste. Marie.....	Algoma District.
BRITISH COLUMBIA—		
Cons. Mining & Smelting Co. Ltd. (a).....	Trail.....	Greenwood M.D.
		Osoyoos M.D.

Firms in Gypsum Mining Industry, 1943

NOVA SCOTIA—		
Canadian Gypsum Co. Ltd.....	170 Bloor St. W., Toronto, Ont.....	Wentworth.
Conn. Adamant Plaster Co.....	10 River St., New Haven, Conn.....	Cheverie.
Gypsum, Lime & Alabastine, Canada, Ltd. (x).....	Paris, Ont.....	Baddeck Bay.
National Gypsum (Canada) Ltd.....	325 Delaware Ave., Buffalo, N.Y.....	Walton, Dingwall, Cheticamp.
Victoria Gypsum Co. Ltd. (x).....	Little Narrows.....	Little Narrows.
Windsor Plaster Co. Ltd.....	Windsor.....	Brooklyn, Hants Co.

DIRECTORY OF FIRMS—Continued

Firms in Gypsum Mining Industry, 1943—Concluded

Name of firm	Head office address	Location
NEW BRUNSWICK— Canadian Gypsum Co. Ltd.....	170 Bloor St. W., Toronto, Ont.....	Hillsborough
ONTARIO— Canadian Gypsum Co. Ltd..... Gypsum, Lime & Alabastine, Canada, Ltd...	170 Bloor St. W., Toronto..... Paris.....	Hagersville. Caledonia.
MANTOBA— Gypsum, Lime & Alabastine, Canada, Ltd... Western Gypsum Products Ltd.....	Paris, Ont..... 503 McArthur Bldg., Winnipeg.....	Gypsumville. Amaranth.
BRITISH COLUMBIA— Gypsum, Lime & Alabastine, Canada, Ltd...	Paris, Ont.....	Falkland.

The Iron Oxide Mining Industry

QUEBEC— Argall, Thomas H..... Girardin, Chas. D..... Mauricie Oxide Co..... The Sherwin-Williams Co. of Canada Ltd. (x)	Pointe du Lac..... Yamachiche..... 259-6th Ave., Grand Mère..... 2875 Centre St., Montreal.....	Pointe du Lac. Almaville. St. Adelphe. Red Mill.
BRITISH COLUMBIA— Davidson, J. G.....	346 Surfton Place, La Jolla, California, U.S.A.	Alta. Lake.

(x) Produce refined grades.

The Canadian Mica Mining Industry

(x) Active but no shipments made.

(b) Operates a grinding mill.

(a) Markets dressed mica.

(c) Not recorded.

(d) Mines muscovite mica.

QUEBEC— Ahearn, W. (a)..... Banca Mining & Exploration Co. Ltd. (x)..... Beauchemin, J. (a) (d)..... Bélanger, Arthur..... Bigras, E..... Bigelow, John (a)..... Blackburn Bros. (a) (b).....	538 MacLaren St., Ottawa, Ont..... 11 King St. W., Toronto, Ont..... 5841 Côte des Neiges, Montreal..... Perkins, Que..... Notre-Dame-du-Laus..... Calumet..... 85 Sparks St., Ottawa, Ont.....	Hull Tp. Portland Tp. (c). (c). (c). (c). (c). Cantley. Perkins Mills. Ottawa.
Blood, A. P. (a)..... Charbonneau, Ronaldo..... Chénier, Z. E. (a)..... Clément, A..... Cross, L. E..... Cross, Walter C. (a)..... Charbonneau, N..... Côté, W. R..... Charron, A..... Delisle, Jos..... de Rainville, J. Paul..... Dézziel, Alex..... Dominion Mica (a)..... Dwyer, C. J. (a) (d)..... Gauthier, J. B..... Gillies, W..... Industrial Mica Co. Ltd. (a)..... Lafontaine, R..... Lefebvre, N. (a)..... Larabie, A..... Linmac Mica Ltd..... McGarry, Ed..... McGlashan, R. J. (a)..... Mica Company of Canada Ltd. (a)..... Mica Laurentian Ltd. (d)..... Peterson, S. M. (a)..... Prud'homme, Oscar (a)..... Rainville, A..... Robson, Bruce C. (x)..... Renaud, A..... Saguenay, La Corp. Les Minéraux du (a) (d)..... Seguin, E. R. (d)..... Simard, E. (d) (a).....	c/o A. O. Schoonmaker, 161 Sixth Ave., New York, N.Y..... Perkins..... Rockland, Ont..... Buckingham..... Casacades..... 209 Bridge St., Hull..... Perkins..... 115 Filiatroult St., Ville St. Laurent..... 37 Sacré-Cœur, Hull..... Mistassini..... Perkins..... Wilson's Corners..... 14 St. Valier St., Quebec..... 1006 St. Zotique St., Montreal..... Buckingham..... Smithville, Ont..... 6998 Jeanne Mance St., Montreal..... Perkins..... Notre-Dame-du-Laus..... Perkins Mills..... Room 1413, Royal Bank Bldg., Montreal..... Wilson's Corners..... 190 Montcalm St. Hull..... Hull..... Victory Bldg., Toronto, Ont..... 1851 Henderson Ave., Ottawa, Ont..... Perkins..... Perkins Mills..... 125 Holland Ave. Ottawa Ont..... Perkins..... St. Joseph d'Alma..... Buckingham..... Bergeronnes.....	Denholm Tp. (c). Grenville Tp. Derry Tp. Casacades. Hull Tp. (c). Laurel. (c). Lac St. Jean. Perkins. Wakefield E. Tp. (c). Chibougamau area. Portland W. Tp. Papineau Co. Wilson's Corners. Perkins. (c). (c). Cantley. (c). (c). Hull. Bergeronnes Tp. St. Pierre de Wakefield. (c). (c). (c). Low Tp. (c). Saguenay Dist. (c). Bergeronnes.

DIRECTORY OF FIRMS—Continued

The Canadian Mica Mining Industry—Concluded

Name of operator	Head office address	Location
QUEBEC—Concluded		
Sparks, W. M. E.	Woodroffe, Ont.	Whitefish Lake.
St. Lawrence Mining Corp. Ltd. (a)	132 St. James St. W., Montreal.	(c).
Sylvanite Gold Mines Ltd. (a)	Box 670, Kirkland Lake, Ont.	Portland Tp. W.
TeeGee Ltd. (a)	Royal Bank Bldg., Montreal.	(c).
Valley, P. (a)	Buckingham.	Portland E. Tp.
Villeuve, E. (d)	3484 Côte des Neiges, Montreal.	Portbriand Tp.
Wallingford, E. Ltd. (a)	Perkins.	Templeton Tp.
Wallingford, A. (a)	Gatineau Pointe.	(c).
Wallingford, Jos. N. (a)	Glen Almond.	Glen Almond.
Wallingford, W. M. (a)	Gatineau Pointe.	(c).
White, A. W. Mica Ltd. (a)	Suite 407-67 Yonge St., Toronto, Ont.	Wells Tp.
Wilson, Wm. S. (a)	Cascades.	Thorne Tp.
ONTARIO—		
Amber Ridge Mica Co. (a)	Westport.	(c).
Amic Mica Mines Ltd. (d) (a)	80 Richmond St. W., Toronto.	Eau Claire.
Biram Mines Ltd. (a)	Room 508, 11 King St. W., Toronto.	Burgess N. Tp.
Bonfield Mica Prospecting Synd. (d)	Suite 504, 112 Yonge St., Toronto.	Dickens Tp.
Canadian Flint & Spar Co. Ltd. (d)	512 Victoria Bldg., Ottawa.	Dickens Tp.
Fillion, S. O. (a)	432 Kensington Ave., Ottawa.	(c).
Kingston Mica Mining Co. Ltd.	Godfrey.	Bedford Tp.
Lee, W. W. (a) (d)	Perth Road.	(c).
Laughrin Prospecting Synd. (x)	371 Bay St., Toronto.	Laughrin Tp.
Loughborough Mining Co. Ltd. (a)	Sydenham.	Various.
Mattarig Mica Mining Synd. Ltd. (x)	c/o W. R. Binch, 38 King St. W., Toronto.	Mattawan and Olgiv Tps.
Micaspar Industries Ltd. (a)	16 James St. S. Hamilton.	Loughborough Tp.
Major Mica Mines Ltd. (a)	See Micaspar Industries Ltd.	
O'Connor, W. J. (a)	Lombardy.	Leeds Co.
Orser, S. H.	Verona.	Bancroft.
Perth Mica Ltd. (a)	See Biram Mines Ltd.	
Purdy Mica Mines Ltd. (a) (d)	Oak St., North Bay.	Mattawan and Olgiv Tps.
Watts, R. W. (a)	Perth.	(c).
BRITISH COLUMBIA—		
Fairey & Co. (b)	661 Taylor St., Vancouver, B.C.	Vancouver.
McKay, R. C.	Oliver.	Oliver.
Richmond, Geo. W. & Co. (b)	4190 Blenheim St., Vancouver	

The Canadian Peat Industry

(x) Active but no shipments made.
(a) Produces moss.

(b) Produces peat fuel.
(c) Produces humus.

NEW BRUNSWICK—		
Fofard Peat Moss Co. (a)	Shippegan.	Shippegan.
Western Peat Co. Ltd. (x)	Box 699, New Westminster, B.C.	Shippegan.
QUEBEC—		
Belleau, Eugène (b)	103 Catherine St. S., Hamilton, Ont.	Bellechasse Tp.
Bourque, Clovis (a) (b)	St. Marc des Carrières.	St. Marc des Carrières,
		St. Alban.
Canada Peat Ltd. (a)	Rivière du Loup.	Withworth Tp.
Excel Peat Ltd. (a) (b)	Rivière du Loup.	Isle-aux-Coudres.
Faucher, Arthur (b)	Grondines.	Grondines.
Maple Leaf Peat Co. (a)	Rivière du Loup.	Withworth Tp.
Murphy, Patrick (a) (b)	St. Romual.	St. Lambert.
Produits de Tourbe Beaucejour (b)	St. Romual.	Beaucejour Tp.
Perfect Peat Products Co. (a)	Rivière du Loup.	Withworth Tp.
Premier Peat Moss Ltd. (a)	Isle Verte.	Isle Verte.
Proulx, Georges (b) (x)	187 Cartier St., Chicoutimi.	Bagot Tp.
Produits Tourbe de Garthby (b)	Garthby.	Garthby.
Quebec Peat Moss Co. (a) (b)	St. Guillaume d'Upton.	St. Bonaventure.
Roy, Louis (a)	Rivière Blanche.	Rivière Blanche.
Roy, Roméo (a)	St. Ulric.	St. Ulric.
Tourbière de Pointe-au-Père (a) (b)	Mont Joli.	Pointe-au-Père.
Tourbière Rivière Ouelle (a)	c/o F. X. Lambert, 2 Côte d'Abraham.	Rivière Ouelle.
Waterville Moss & Peat Mine (a)	Waterville.	Waterville.
ONTARIO—		
Arctic Peat Moss Corp. Ltd. (a)	200 Sterling Securities Bldg., Winnipeg, Man.	Crozier.
Canadian Industries Limited (c)	1135 Beaver Hall Hill, Montreal, Que.	Harwick Tp.
Canadian Humus Products Reg. (c)	Suite 1010, 100 Adelaide St. W., Toronto.	Beverly Tp.
Erie Peat Ltd. (a)	105 E. Main St., Welland.	Welland.
Leasa Peat Works (b)	R.R. 2, Gads Hill.	Ellice Tp.
Pringle, J. A. (a)	Arden.	Arden.
Polar Bear Peat Moss Products Reg. (a)	Fort Frances.	Pinewood.
Stuart, Walter J. (b)	Morewood.	Morewood.
Wallace, D. A. (b)	Osgoode.	Osgoode Tp.

DIRECTORY OF FIRMS—Continued

The Peat Industry—Concluded

Name of firm	Head office address	Location
MANITOBA—		
McMillan, N. (a).....	Lac du Bonnet.....	Lac du Bonnet.
Winnipeg Supply & Fuel Co. Ltd. (a).....	812 Boyd Bldg., Winnipeg.....	Moss Spur.
ALBERTA—		
Moss Tex Ltd. (a).....	10250-107th St., Edmonton.....	Winterburn.
BRITISH COLUMBIA—		
Alouette Peat Products Ltd. (a).....	Pitt Meadows.....	McTavish Road.
Byrnerood Peat Farm (a).....	2707 McKay Ave., New Westminster.....	Byrne Road.
B.C. Peat Co. Ltd. (a).....	304 Royal Bank Bldg., Vancouver.....	New Westminster.
Coast Peat Co. Ltd. (a).....	736 Granville St., Vancouver.....	Burnaby.
Columbia Products Ltd. (a).....	Box 699, New Westminster.....	Richmond Tp.
		Lulu Island.
Excelsior Peat Ltd. (a).....	6633 Yew St., Vancouver.....	Burnaby.
Industrial Peat Co. (a).....	Box 329, New Westminster.....	Delta Municipality.
Lulu Island Peat Co. Ltd. (a).....	R. R. 2, Eburne.....	Richmond Tp.
Northern Peat Moss Co. Ltd. (a).....	R. R. 2, Eburne.....	Richmond Tp.
Pacific Peat Products Ltd. (a).....	814 Hall Bldg., Vancouver.....	New Westminster.
Western Peat Co. Ltd. (a).....	Box 699, New Westminster.....	Westminster Highway.

The Salt Industry

NOVA SCOTIA—		
Malagash Salt Co. Limited.....	196 Provost St., New Glasgow.....	Cumberland Co.
ONTARIO—		
Brunner, Mond Canada, Ltd.....	Canadian Bank of Commerce Bldg., Toronto	Essex Co.
Canadian Industries Limited.....	Box 10, Montreal, Que.....	Essex Co.
Goderich Salt Co. Ltd.....	Box 577, Goderich.....	Goderich.
Sifto Salt Co. Ltd.....	2240 Sun Life Bldg., Montreal, Que.....	Sarnia.
Warwick Pure Salt Co. Ltd.....	R.R. 5, Watford.....	Lambton Co.
Western Canada Flour Mills Co. Ltd.....	287 MacPherson Ave., Toronto.....	Goderich.
MANITOBA—		
Neepawa Salt Ltd.....	Box 10, Montreal, Que.....	Neepawa.
ALBERTA—		
Industrial Minerals Ltd.....	2240 Sun Life Bldg., Montreal, Que.....	Waterways.

The Talc and Soapstone Industry

(x) Active but not producing.

QUEBEC—		
Baker Mining & Milling Co. Ltd.....	4010 St. Catherine St. W., Montreal.....	Highwater.
Broughton Soapstone & Quarry Co. Ltd.....	Broughton Station.....	Broughton Station.
Fortin, Charles.....	Robertsonville.....	Thetford Tp.
Pharo, L. C.....	187 St. Maurice St., Thetford Mines.....	Leeds Tp.
Maple Leaf Soapstone (x).....	West Broughton.....	W. Broughton.
ONTARIO—		
Canada Talc Limited.....	Madoc.....	Huntingdon Tp.
Steele, W. C.....	Madoc.....	Ompah.
BRITISH COLUMBIA—		
Wartime Metals Corp. (x).....	637 Craig St. W., Montreal, Que.....	Kootenay National Park.

THE MISCELLANEOUS NON-METAL MINING INDUSTRIES

Asphalt

* Active but not producing.

Name of operator, province and product	Head office address	Plant location
ALBERTA— Oil Sands Ltd. (*).....	455 St. John St., Montreal, Que.....	Bitumont.

Barite

NOVA SCOTIA— Canadian Industrial Minerals Ltd.....	Walton, N.S.....	Walton.
BRITISH COLUMBIA— Summit Lime Works Ltd.....	Box 273, Lethbridge, Alta.....	Golden M.D.

Brucite

QUEBEC— Aluminum Company of Canada Ltd.....	Sun Life Building, Montreal.....	Wakefield.
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Diatomite

NOVA SCOTIA— G. W. Wightman (Mrs.).....	Smith's Cove, N.S.....	Digby Co.
BRITISH COLUMBIA— Failey and Co.....	661 Taylor Sgt., Vancouver.....	Cariboo M.D. Vancouver.

Fluorspar

NOVA SCOTIA— Papke, William.....	Trout River, N.S.....	Inverness Co.
QUEBEC— Allevato, T. (*).....	Rouyn, Que.....	Huddersfield Tp.
ONTARIO— Bassett Fluorspar Mining Synd. Ltd.....	Room 908, 36 Toronto St., Toronto.....	Madoc Tp.
Gilman, R. T.....	Madoc.....	Huntingdon Tp.
Millwood Fluorspar Mines Ltd.....	204 McKinnon Bldg., Toronto.....	Hastings Co.
Montgomery, F. K.....	Havelock.....	Cardiff Tp.
Reliance Fluorspar Mining Synd. Ltd.....	c/o W. J. Symon, Madoc.....	Huntingdon Tp.
Stocklosar, Chas. A.....	Box 198, Madoc.....	Huntingdon Tp.
Tops Mining Synd. Ltd.....	c/o W. E. Clark, Harcourt.....	Harcourt.
Trent Mining Synd. Ltd.....	213 Dundas St. E., Trenton.....	Madoc.
Wood Land Mineral Company.....	19 John St. S., Hamilton.....	Huntingdon Tp.

Garnets

ONTARIO— Niagara Garnet Co. (*).....	Box 835, Niagara Falls, N.Y.....	River Valley.
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Graphite

ONTARIO— Black Donald Graphite Ltd.....	Calabogie.....	Brougham Tp.
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THE MISCELLANEOUS NON-METAL MINING INDUSTRIES—Continued

Grindstones

NOTE.—(*) Active but not producing.

Name of operator, province and product	Head office address	Plant location
NEW BRUNSWICK— Read, H. C.	Bathurst	Stonehaven.

Lithium Minerals

MANITOBA— Lithium Corp. of Canada Ltd. (*)	403 Avenue Bldg., Winnipeg	Bernic and Cat Lakes.
Sherritt Gordon Mines Ltd. (*)	25 King St. W., Toronto	Herb Lake.

Magnesitic Dolomite

QUEBEC— Canadian Refractories Ltd.	1050 Canada Cement Bldg., Montreal	Kilmar, Harrington.
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Mineral Waters

QUEBEC— Biron and Courville	St. François du Lac	St. François du Lac.
Cie d'Eau Minérale de St. Hyacinthe	632 Concord St., St. Hyacinthe	St. Hyacinthe.
Gurd, Chas. & Co. Ltd.	1016 Bleury St., Montreal	Varenes.
Eau Minérale Etoile	Ste. Genevieve de Batiscan	Batiscan.
Eau Naturelle Purgative de Chambord Ltd. (*)	Desbiens	Chambord.
Lemay, Lucien	St. François du Lac	Nicolet Tp.
Levesque, Ernest (*)	Rivière du Loup Station	St. Germain de Kamouraska.
Minard, Edouard	Maskinongé	Maskinongé.
Mont-Clair Richelieu Spring Water Co. Ltd.	c/o J. G. Gravelle, 3711 Basset St., Montreal	Chambly.
Pellerin, Albert & Sons	St. Barnabé N., Quebec	St. Barnabé N.
Source d'Eau Minérale Radnor	St. Maurice	Radnor Tp.
Source d'Oulombia	L'Epiphanie	L'Epiphanie.
Usine d'Embouteillage Maski	St. Justin	St. Justin.
ONTARIO— Belleville Aqua Vital Co. Ltd.	201 McDonald Ave., Belleville	ThurLOW Tp.
Carlsbad Springs	Carlsbad	Carlsbad.
Deneault, J. F.	Bourget	Bourget.
Gurd, Chas. & Co. Ltd.	1016 Bleury St., Montreal, Que.	Caledonia Springs.
Renaud, Victor	Blackburn	Blackburn.

Phosphate

QUEBEC— Bigelow, Robert	Buckingham	Papineau Co.
Crang, J. K. Corp.	24 Adelaide St. E., Toronto, Ont.	Buckingham Dist.
High Rock Phosphates Ltd. (*)	11 des Ramparts	Buckingham Dist.
ONTARIO— Cordick, Hilliard V.	6 Church St., Perth	Burridge.
Ontario Phosphate Co.	Westport	Westport.
Riley, C.	1110 Concourse Bldg., Toronto	Burridge.
Robson, Bruce C.	125 Holland Ave., Ottawa	Burridge.

Silica Brick

NOVA SCOTIA— Dominion Steel & Coal Corp. Ltd.	Sydney, N.S.	Sydney.
ONTARIO— Algoma Steel Corp. Ltd.	Sault Ste. Marie	Sault Ste. Marie.

THE MISCELLANEOUS NON-METAL MINING INDUSTRIES—Concluded

Sodium Carbonate

NOTE.—(*) Active but not producing.

Name of operator, province and product	Head office address	Plant location
BRITISH COLUMBIA— Bishop, Viola C. (Mrs.).....	c/o Boyds Garage, Clinton.....	Clinton area.
Davison, E. C.....	2043 W. 42nd Ave., Vancouver.....	Clinton area.

Sodium Sulphate

SASKATCHEWAN— Horseshoe Lake Mining Co. Ltd.....	Ormiston.....	Ormiston.
Midwest Chemicals Ltd.....	Palo.....	Whiteshore Lake.
Mellor, J. F.....	Alsask.....	Alsask.
Natural Sodium Products.....	Bishopric.....	Alsask, Frederick Lake.
Sybouts Sodium Sulphate Co. Ltd.....	46 Goodwin Terrace, Westwood, N.J., U.S.A.	Surprise Valley.

Sulphur (Pyrites)

QUEBEC— Aldermac Copper Corp. Ltd.....	Dominion Square Bldg., Montreal.....	Arntfield.
Noranda Mines Ltd.....	Royal Bank Bldg., Toronto, Ont.....	Noranda.
ONTARIO— International Nickel Co. of Canada Ltd. (†)..	Copper Cliff.....	Copper Cliff.
BRITISH COLUMBIA— Consolidated Mining & Smelting Company of Canada Ltd. (†).....	Trail.....	Trail.
Britannia Mining & Smelting Co. Ltd.....	Britannia Beach.....	Britannia Beach.

Volcanic Dust

SASKATCHEWAN— Spagrud, Thor.....	Rockglen.....	Rockglen.
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(†) Recover sulphur from smelter gases.

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CANADIAN PORTLAND CEMENT PRODUCERS

Name of firm	Head office address	Location of plant
QUEBEC— Canada Cement Company Ltd.....	Box 290, Station B, Montreal.....	Hull, Montreal East.
ONTARIO— Canada Cement Company Ltd..... St. Mary's Cement Company Ltd.....	Box 290, Station B, Montreal, Que..... 357 Bay St., Toronto.....	Belleville, Port Colborne St. Mary's.
MANITOBA— Canada Cement Company Ltd.....	Box 290, Station B, Montreal, Que.....	Fort Whyte.
ALBERTA— Canada Cement Company Ltd.....	Box 290, Station B, Montreal, Que.....	Exshaw.
BRITISH COLUMBIA— British Columbia Cement Co. Ltd.....	500 Fort St., Victoria, B.C.....	Bamberton.

THE DOMESTIC CLAY PRODUCTS INDUSTRY

NOVA SCOTIA— Brooks, Stephen and Son..... Harriss Bros..... McCurdy, Henry..... Shaw, L. E., Ltd..... Standard Clay Products Ltd.....	Box 159, New Glasgow..... 5 Byng Ave., Sydney..... Middle Musquodoboit..... 8 Prince St., Halifax..... St. Johns.....	New Glasgow. Sydney. Middle Musquodoboit, Lantz. New Glasgow.
NEW BRUNSWICK— Ryan, M. and Son, Ltd..... Shaw, L. E. Ltd.....	Fredericton..... 8 Prince St., Halifax, N.S.....	Fredericton. Chipman.
QUEBEC— Ascot Tile and Brick Co. Ltd..... Canada China Clay & Silica Ltd..... Castonguay, Hubert..... Champlain Brique Ltée, La..... Citadelle Brique Ltée..... Crite, Freddy..... LaPrairie Company Inc., The..... Lotbinière Brique Reg., La..... Montreal Terra Cotta Limited..... Roy, O. and P..... St. Lawrence Brick Co. Ltd..... Scott Brique Reg., La..... Standard Clay Products Ltd.....	Ascot Corner..... Kasil..... Deschailions..... c/o H. Boulet, 15 St. Peter St., Quebec..... 14 rue St. Joseph, Quebec..... rue du Moulin, St. Tite..... 906 University Tower Bldg., Montreal..... Deschailions..... 911 Dominion Square Bldg., Montreal..... St. George West..... 1010 St. Catherine St. W., Montreal..... Scott Junction..... Box 189, St. Johns.....	Ascot Corner. Kasil. Deschailions. In liquidation. Boischatel. St. Tite. LaPrairie, Delson. Deschailions. Lakeside. St. George West. LaPrairie. Scott Junction. St. Johns.
ONTARIO— Barnes, Wm. R. Co. Ltd..... Broadwell, B. and Son..... Canadian Pressed Brick Co. Ltd..... Central Tile Bricks Corp. Ltd..... Chapman Bros..... Construction Materials Ltd..... Cooksville Company Ltd..... Cornhill, James & Sons Ltd..... Coults, George & Son..... Curtis Bros..... Deller, Albert & Son..... Doehart Brick, Tile & Terra Cotta Works..... Douglas, John R..... Elliott, James, Jr..... Elliott, Wm..... Fletcher Brick & Tile..... Frid Bros. Ltd..... Gammage, C. R..... Hamilton Pressed Brick Co. Ltd..... Hill, A. W. & Sons..... Huntsville Brick Works..... Interprovincial Brick Co. Ltd..... Jamieson Lime Co..... Jones, D. A..... Jasperson Brick & Tile Co..... Koebel Bros..... Lindsay, Earl & Sons..... Martin, Amos C..... McFarlane, W. J..... McFarren, F. B., Ltd..... Milton Brick Co. Ltd..... Missinibi Clays & Mining Ltd.....	243 Cumberland Ave., Hamilton..... Kingsville..... Kenilworth Ave. S., Hamilton..... Tilbury..... 145 Dawes Rd., Toronto..... Drawer 70, New Toronto..... 46 Bloor St. W., Toronto..... Box 36, Chatham..... Thetford..... Box 809, Peterborough..... Brownsville..... Arnprior..... Wilkesport..... 519 Wellington St. W., Sault Ste. Marie..... R.R. 1, Glenannan..... Fletcher..... Main and Macklin Sts., Hamilton..... R.R. 2, Dresden..... 211 Kensington Ave. S., Hamilton..... Coatsworth..... Box 308, Huntsville..... 46 Bloor St. W., Toronto..... Renfrew..... Mt. Brydges..... Kingsville..... St. Clements..... R.R. 2, Wallaceburg..... R.R. 3, Wallenstein..... Forest..... 120 Wellington St. W., Toronto..... 170 Bloor St. W., Toronto..... 564 Adelaide St. E., Toronto.....	Waterdown. Gosford S. Tp. Hamilton. Tilbury. East York Tp. Etobicoke Tp. Cooksville. Harwich Tp. Bosanquet. Otonabee Tp. Brownsville. Arnprior. Lambton Co. Korah Tp. Bruce Co. Tilbury E. Tp. Hamilton. Camden Tp. Wentworth Co. Tilbury E. Tp. Chaffey Tp. Chesham, Milton. Renfrew. Caradoc Tp. Coatsworth Tp. St. Clements. Kent Co. Peel Tp. Forest. Streetsville. Equeusing Tp. Missinibi Dist.

THE DOMESTIC CLAY PRODUCTS INDUSTRY—Concluded

Name of firm	Head office address	Location of plant
ONTARIO—Concluded		
Moscow Brick & Tile Works.....	R.R. 1, Greenock.....	Culross Tp.
Napanee Brick & Tile Works.....	R.R. 3, Napanee.....	Lennox Co.
National Fireproofing Co. of Canada Ltd.....	57 Bloor St. W., Toronto 5.....	Aldershot.
National Sewer Pipe Co. Ltd.....	Aldershot.....	E. Flamboro Tp., Hamilton.
Northern Brick & Clay Products.....	New Liskeard.....	Swansea.
Norwich Brick & Tile Works.....	R.R. 2, Norwich.....	Temiskaming.
Ottawa Brick & Terra Cotta Co. Ltd.....	Billings Bridge.....	Oxford Co.
Paxton, Fred R.....	70 Herrick Ave., St. Catharines.....	Billings Bridge.
Phinn Brick Co.....	1042 Adelaide St., London.....	St. Catharines.
Phippen & Son.....	390 Dawes Rd., East York.....	London.
Seegmiller, E. & E., Ltd.....	525 Wendell Ave., Kitchener.....	East York.
Snelgrove, A., Estate.....	Beaverton.....	Kitchener.
Sproat and Sproat.....	R.R. 4, Seaford.....	Tuckersmith Tp.
Standard Brick Co.....	500 Greenwood Ave., Toronto.....	Beaverton.
Superior Brick & Tile Co. Ltd.....	426 Victoria Ave., Fort William.....	Tuckersmith Tp.
Toronto Brick Co. Ltd.....	897 Bay St., Toronto.....	Toronto.
Wallace, R., & Son.....	92 First Ave., North Bay.....	Paiponge Tp.
Wright, F. M.....	Comber.....	Toronto, York Tp.
MANITOBA—		
Alsip Brick, Tile & Lumber Co. Ltd.....	537 Portage Ave., Winnipeg.....	Winnipeg.
Pembina Mt. Clays Ltd. (*).....	915 Paris Bldg., Winnipeg.....	Morden.
Wardrop, D. M.....	Whitemouth.....	Whitemouth.
SASKATCHEWAN—		
Alberta Clay Products Co. Ltd.....	Medicine Hat, Alta.....	Ravensrag.
Bruno Clay Works Ltd.....	411 Albert Ave., Saskatoon.....	Eastend.
Dominion Fire Brick & Clay Products Ltd...	Box 99, Moose Jaw.....	Willows.
International Clay Products Ltd.....	Box 399, Estevan.....	Bruno.
Medalta Potteries Ltd.....	620-3rd St. W., Calgary, Alta.....	Claybank.
ALBERTA—		
Aome Brick Co. Ltd.....	125 Alberta Block, Edmonton.....	Estevan.
Aetna Coal Co.....	East Coulee.....	Willows, Eastend.
Alberta Clay Products Co. Ltd.....	Medicine Hat.....	Bruno.
Grande Prairie Brick Yard.....	Grande Prairie.....	Claybank.
Gunderson Brick & Coal Co. Ltd.....	Redcliffe.....	Estevan.
Kidd, Gordon L. (*).....	Box 230, Drumheller.....	Willows, Eastend.
Medicine Hat Brick & Tile Co. Ltd.....	Box 100, Medicine Hat.....	
Redcliffe Pressed Brick Co. Ltd.....	Redcliffe.....	
BRITISH COLUMBIA—		
Baker Brick & Tile Co. Ltd.....	3191 Douglas St., Victoria.....	Cannell.
Champion & White Ltd.....	1075 Main St., Vancouver.....	Rosedale Ferry.
Clayburn Co. Ltd.....	850 W. Hastings St., Vancouver.....	Dunmore.
Fairey & Co.....	661 Taylor St., Vancouver.....	Medicine Hat.
Gypsum, Lime & Alabastine Canada, Ltd. (*)	Paris, Ont.....	Grande Prairie.
Glover, F. (*).....	Princeton.....	Redcliffe.
Haug, Wm. & Son.....	Box 220, Kelowna.....	Sec. 14-29-20 W. 4.
Port Haney Brick Co. Ltd.....	846 Howe St., Vancouver.....	Medicine Hat.
		Redcliffe.

(*) Produces Bentonite.

PRODUCERS OF STONEWARE AND POTTERY FROM DOMESTIC CLAY

Name of firm	Head office address	Location of plant
NEW BRUNSWICK—		
Canuck Pottery.....	198 Union St., Saint John.....	Saint John.
Deichmann, K. and E.....	Moss Glen.....	Moss Glen.
Foley Pottery Ltd.....	Saint John.....	Musquodoboit.
QUEBEC—		
Poterio du Saguenay, La.....	Chicoutimi.....	Chicoutimi.
Laurentian Art Pottery Inc.....	St. Jérôme.....	St. Jérôme.
ONTARIO—		
Foster Pottery Co.....	Main St. W., Hamilton.....	Hamilton.
ALBERTA—		
Medalta Potteries Ltd.....	620-3rd St. W., Calgary.....	Medicine Hat.
Medicine Hat Potteries.....	Medicine Hat.....	Medicine Hat.

THE IMPORTED CLAY PRODUCTS INDUSTRY

Name of firm	Address
QUEBEC—	
Canada Firebrick Company Ltd.....	4741 St. Ambroise St., Montreal.
Canadian Potteries Ltd.....	5 Mackenzie King St., St. Johns.
Standard Clay Products Ltd.....	St. Johns.
Walker-Hind-Sutherland Refractories Ltd.....	309 St. Ferdinand St., Montreal.
ONTARIO—	
Armco Ltd.....	24 Wellington St. W., Toronto.
Canadian Ohio Brass Company Ltd.....	Thorold Rd., Niagara Falls.
Canadian Porcelain Company Ltd.....	Paradise Rd., Hamilton.
Canada Vitriified Products Ltd.....	Talbot St. E., St. Thomas.
Dominion Potteries Ltd.....	Dundas St. W., Oakville.
Donvale Pottery Co.....	27 Davies Ave., Toronto 8.
Ecanada Art Pottery Ltd.....	2 Paradise Rd., Hamilton.
Frontenac Floor & Wall Tile Co. Ltd.....	Kingston.
Green, A. P., Fire Brick Co. Ltd.....	Commercial St. (Leaside), Toronto 12.
Hamilton Potteries Ltd.....	100 Locke St., Hamilton.
McMaster Pottery.....	Main St., Dundas.
National Refractories Ltd.....	Port Robinson.
Ontario Refractories Ltd.....	Port Robinson.
Piblico Jointless Firebrick Ltd.....	Horner Ave., Toronto 14.
Robinson Clay Product Co. of Canada Ltd.....	119 Shaftesbury Ave., Toronto.
Smith Potteries.....	353 King St. W., Oshawa.
Sovereign Potteries Ltd.....	282 Sherman Ave. N., Hamilton.
Turner's Plastic Fire Brick Co. Ltd.....	Audley St., Mimico.
Georgetown Clay Products Ltd.....	King St., Georgetown.
BRITISH COLUMBIA—	
Allen Refractories.....	69E-1st Ave., Vancouver.

THE LIME INDUSTRY

- (x) Inactive. (b) Use dolomitic limestone.
 (a) Use calcium or high calcium limestone. (c) Purchase lime.
 (d) Kind of limestone not reported.

Name of firm	Head office address	Location of plant
NOVA SCOTIA—		
Dominion Steel & Coal Corp. Ltd. (b).....	Sydney.....	Sydney.
Eastern Lime Co. Ltd. (a).....	Windsor.....	Windsor.
NEW BRUNSWICK—		
Bathurst Power & Paper Co. Ltd. (a).....	Bathurst.....	Bathurst.
Purdy and Green Ltd. (a).....	204 Metcalfe St., Saint John.....	Saint John.
Snowflake Lime Ltd. (a) (b).....	Saint John.....	Saint John.
Saint John Lime Co. (x) (a) (b).....	Brookville.....	Brookville.
QUEBEC—		
Aluminum Company of Canada Ltd. (b).....	1700 Sun Life Bldg., Montreal.....	Wakefield.
Arnaud, Edwilda (d).....	Joliette.....	Joliette.
Canadian Refractories Ltd. (b).....	1050 Canada Cement Bldg., Montreal.....	(c).
Carrière St. Maurice Ltd. (d).....	1293 rue Hart, Trois Rivières.....	St. Louis de France.
Carrière Trois-Rivières Ltd. (a).....	St. Louis de France.....	St. Louis de France.
Côté, Joseph (a).....	Metabetchouan.....	Metabetchouan.
Dandelin, Z. (d).....	St. Dominique.....	St. Dominique.
Deschambault Quarry Corp. (d).....	St. Marc-des-Carrières.....	St. Marc des Carrières.
Dominion Lime Ltd. (a).....	Lime Ridge.....	Lime Ridge.
Dontigny, Raymond (d).....	Ste. Thècle.....	Ste. Thècle.
Filion, Narcisse (d).....	St. Joachim.....	St. Dominique.
Lalumière, Joseph (d).....	St. Dominique.....	St. Dominique.
Laurentian Stone Co. Ltd. (a).....	195 Nicholas St., Ottawa, Ont.....	Hull.
Limoges, Henri (a).....	552 Poupart St., Montreal.....	St. Michel.
Mercur, Camille (a).....	555-16th Ave., St. Hyacinthe.....	St. Dominique.
Shawinigan Chemicals Ltd. (a).....	Craig St. W., Montreal.....	Shawinigan Falls.
Standard Lime Co. Ltd. (a).....	St. Paul de Joliette.....	St. Paul de Joliette.
Trottier, David (d).....	St. Marc des Carrières.....	St. Marc des Carrières.
ONTARIO—		
Bell, Cecil (d).....	R.R. 4, Chesley.....	Sullivan Tp.
Brunner, Mond Canada, Ltd. (a).....	Canadian Bank of Commerce Bldg., Toronto.....	Anderdon Tp.
Canada & Dominion Sugar Co. Ltd. (a).....	Chatham.....	Wallaceburg.
Canada Lime Co. (a).....	180 Duke St., Toronto.....	Coboconk.
Canadian Gypsum Co. Ltd. (b).....	170 Bloor St. W., Toronto.....	Guelph.
Chemical Lime Co. Ltd. (a).....	Beachville.....	Oxford Co.
Gypsum, Lime & Alabastine, Canada, Ltd. (a) (b).....	Paris.....	Beachville.
		Glen Christie.
		Halton.

THE LIME INDUSTRY—(Concluded)

Name of firm	Head office address	Location of plant
ONTARIO—Concluded		
Jamieson Lime Co. (a).....	Renfrew.....	Horton Tp.
North American Cyanamid Ltd. (a).....	Niagara Falls.....	Niagara Falls.
Rockwood Lime Co. (b).....	Box 46, Rockwood.....	Rockwood.
Shane Lime & Charcoal Co. Ltd. (a).....	Eganville.....	Grattan Tp.
MANITOBA—		
Building Products & Coal Co. Ltd. (b).....	111 Christie St., Winnipeg.....	Inwood.
Gillis Quarries Ltd. (x) (a).....	Richard and Spruce Sts., Winnipeg, Man.....	Garson.
Gypsum, Lime & Alabastine, Canada, Ltd.....	Paris, Ont.....	(c).
Manitoba Sugar Co. Ltd. (a).....	Fort Garry.....	Fort Garry.
Winnipeg Supply & Fuel Co. Ltd. (a).....	812 Boyd Bldg., Winnipeg.....	Moosehorn.
		Stonewall.
ALBERTA—		
Canadian Sugar Factories Ltd. (a).....	Raymond.....	Raymond.
Errico, M. (d).....	Cadomin.....	Picture Butte.
Loder's Lime Co. Ltd. (a).....	Exshaw.....	Cadomin.
Summit Lime Works Ltd. (a).....	Box 273, Lethbridge.....	Kananaskis.
		Crow's Nest Dist.
BRITISH COLUMBIA—		
Pacific Lime Co. Ltd. (a).....	744 W. Hastings St., Vancouver.....	Texada Island.
Pacific Mills Ltd. (a).....	Campbell Ave., Vancouver.....	Ocean Falls.

THE SAND AND GRAVEL INDUSTRY

In addition to the names listed below, production has been reported by the railway companies for ballast, and also a considerable amount by counties and townships in Ontario for road use.

(w) Markets washed or screened material.

NOVA SCOTIA—		
Crockett, V. B.....	71 King St., Truro.....	Colchester Co.
Nova Scotia Department of Highways.....	Halifax.....	Various.
Warren Bituminous Paving Co. (w).....	1454 Bloor St. W., Toronto 9, Ont.....	Yarmouth.
NEW BRUNSWICK—		
Likely, Jos. A. Ltd. (w).....	Saint John.....	East Saint John.
New Brunswick Department of Highways.....	Fredericton.....	Various.
QUEBEC—		
Beaudry, Antoine.....	1706 Plessier, Montreal.....	St. Henri.
Bélanger & Peltier.....	St. Aimé.....	St. Germain and
		St. Dominique.
Bigras, Omer.....	Ste. Rose Ouest.....	Ste. Rose Ouest.
Bonner Sand & Ballast Ltd. (w).....	1434 St. Catherine St. W., Montreal.....	South Durham.
Brosseur, S.....	McWatters.....	McWatters.
Breen, Thos.....	Kearns, Ont.....	Guigues.
Brouillet Sand & Gravel Co.....	Rawdon.....	Ste. Julienne.
Canadian Johns-Manville Co. Ltd.....	Sun Life Bldg., Montreal.....	Asbestos.
Coaticook, Ville de (w).....	Coaticook.....	Coaticook.
Compagnie de Sable Ltée (w).....	10-3ème Ave., Quebec.....	St. Charles River.
Consolidated Oka Sand & Gravel Co. Ltd. (w).....	248 McCord St., Montreal.....	Lake of Two Mountains.
Gagnon, Arthur.....	Grand Mère.....	Guineau Jct.
Gagnon, L. P.....	St. David de Lévis.....	St. Charles River.
General Crushing Co.....	43 Pint Ave., Quebec.....	Rosaire.
Goyer, Edouard & Frère.....	St. Bruno.....	St. Bruno.
Granby, City of.....	Granby.....	Granby.
Hains, Alexandre.....	Beauport.....	Beauport.
Laberge, Evariste.....	Ste. Foy.....	Ste. Foy.
La Corporation de Ville de Magog.....	Magog.....	Magog.
Latulippe, Philippe (w).....	290 rue de la Ronde, Quebec.....	St. Charles River.
Marchand, Euclide.....	Almaville.....	Mont Carmel.
Mercure, Camille.....	St. Hyacinthe.....	St. Dominique.
Quebec, City of.....	Quebec.....	Ste. Thérèse de Beauport
Riverin, Jean Joseph.....	Arvida.....	Various.
Robert & Dufour.....	Ste. Anne de Beaupré.....	Beauport West.
St. Francis River Dredging Co. (w).....	St. François du Lac.....	St. Francis River.
Sherbrooke, City of.....	Sherbrooke.....	Orford Tp.
Standard Lime Co. Ltd. (w).....	Joliette.....	Ste. Emelie.
Standard Sand & Gravel Ltd. (w).....	St. Félix de Valois.....	St. Félix de Valois.
Two Mountains Sand Co.....	Canada Cement Bldg., Montreal.....	Pt. Calumet.
Venne, Oscar.....	Lachenaie.....	Lachenaie.
ONTARIO—		
Adair, Dolson.....	Caledon East.....	Caledon East.
Barnes, Wm., Co. Ltd. (w).....	243 Cumberland Ave., Hamilton.....	Waterdown.
Benson & Patterson.....	Stamford.....	Stamford.
Boyd Bros.....	Osgoode.....	Osgoode.
Burrows, John.....	North Bay.....	Widdifield Tp..
Conlin, Herbert L. (w).....	Highland Creek.....	Scarboro Tp.
Consolidated Sand & Gravel Ltd. (w).....	402 Harbour Commission Bldg., Toronto 1.....	Fuller, Paris and Waterford.
Dibblee Construction Co. Ltd. (w).....	248 Albert St., Ottawa.....	Bowesville Road.

THE SAND AND GRAVEL INDUSTRY—Continued

Name of firm	Head office address	Location
ONTARIO—Concluded		
Dominion Concrete Co. Ltd. (w)	Kemptville	Kemptville.
Ellins Bros. (w)	304 Scarlett Rd., Toronto 9	Etobicoke Tp.
Gauthier, John (w)	Porecupine	Whitney Tp.
Goodreau, Charles, Estate of (w)	Northwood	Harwich Tp.
Grandmaitre, Donat	71 Montreal Rd., Eastview	Rockcliffe Village.
Hollinger Cons. Gold Mines Ltd.	Timmins	Tisdale Tp.
Howard Sand & Gravel Co. Ltd. (w)	Aldershot	E. Flamboro Tp.
Jones, John D.	Wilton Grove	Wilton Grove.
Kingston Sand & Gravel Ltd.	235 Wellington St., Kingston	Kingston Tp.
McAuley, P. L.	Trenton	Trenton.
McLean, A. B. & Sons (w)	Sault Ste. Marie	Sault Ste. Marie.
National Sand & Material Co. Ltd. (w)	402 Harbour Bldg., Toronto	Point Pelee, Niagara River.
Nicholson Transit Co. (w)	River Rouge, Mich., U.S.A.	Eastern Cap.
Quigley's Foundry Sands (w)	Bartonville	Waterdown.
Rayner Construction Ltd. (w)	Leaside	Fergus and Geraldton.
Scott, T. J. (w)	489 Bay St., Sault Ste. Marie	Lake Superior.
Spratt, G. H. (w)	Billings Bridge	Billings Bridge.
Tees Transit Co. (w)	58 Whitton Rd., Hamilton	Niagara Bar.
Towland Construction Co. Ltd. (w)	294 Dundas St. N., London	Dorchester Tp.
United Towing & Salvage Co. (w)	635 Common St., Montreal, Que.	Lake Superior.
Warren Bituminous Paving Co. Ltd. (w)	1454 Bloor St. W., Toronto 9	Huntsville.
White, Bertha M. (w)	209 N. Vidal St., Sarnia	Sarnia.
Woollatt Fuel & Supply Co. Ltd. (w)	Walkerville	Leamington.
MANITOBA—		
Alsip Brick Tile & Lumber Co. Ltd.	537 Portage Ave., Winnipeg	Beausejour.
Brandon, City of	Brandon	Brandon.
Building Products & Coal Co. Ltd.	111 Christie St., Winnipeg	Birds Hill.
Greater Winnipeg Water District	185 King St., Winnipeg	1 Mile 31 and Mile 80, G.W.W.D. Ry.
Manitoba Department of Highways	Winnipeg	Various.
McCurdy Supply Co. Ltd. (w)	1034 Arlington St., Winnipeg	
Winnipeg, City of	223 James Ave., Winnipeg	Birds Hill.
SASKATCHEWAN—		
Betteridge, Stanley	Pilot Butte	Pilot Butte.
Eamon, H. G. & Co.	Biggan	Biggan.
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Bldg., Winnipeg, Man.	Flin Flon.
North Battleford, City of	1201 King St., North Battleford	North Battleford.
Prince Albert, City of	Prince Albert	Prince Albert.
Saskatchewan Department of Highways	Regina	Various.
Tobiasen, Martin	Sceptre	Sceptre.
Wamsley, R.	Snipe Lake	Snipe Lake.
ALBERTA—		
Alberta Department of Highways	Edmonton	Various.
Cristall Sand	10165-104th St., Edmonton	Perryvale.
Jefferies & Sons Ltd. (w)	Calgary	Calgary.
BRITISH COLUMBIA—		
Armstrong, City of	Armstrong	Vernon.
British Columbia Department of Highways	Victoria	Various.
Chilliwack, City of	Chilliwack	Chilliwack Tp.
Consolidated Mining & Smelting Co. Ltd. (w)	Trail	Fort Steele and Tadanac.
Deeks Sand & Gravel Co. Ltd. (w)	101 West First Ave., Vancouver	Seymour Creek, North Vancouver and Coquitlam.
Fernie, City of	Fernie	Fernie.
Gilley Bros. Ltd. (w)	902 Columbia St., New Westminster	Port Coquitlam.
Gravel Contractors Ltd.	Dawson Creek	Pouce Coupe River.
Highland Sand & Gravel Co. Ltd. (w)	Lynnour	Lynnour.
Hillside Sand & Gravel Co. Ltd. (w)	1075 Main St., Vancouver	Hillside and Howe Sound.
McIntyre & Harding (w)	Royal Oak P.O., Saanich	Victoria.
Nelson, City of (w)	501 Front St., Nelson	Nelson.
Pitkethly Bros. (w)	8699 Angus Drive, Vancouver	Vancouver.
Port Alberni, City of	Port Alberni	Alberni District.
Port Coquitlam, City of	Port Coquitlam	Port Coquitlam.
Producers Sand & Gravel Co. (1929) Ltd. (w)	1902 Store St., Victoria	Esquimalt.
Road Materials Ltd. (w)	8699 Hudson St., Vancouver	North Vancouver.
Saanich, District of	Royal Oak P.O., Vancouver Island	Saanich Municipality.

THE STONE QUARRYING INDUSTRY

- (x) Firms operating dressing works in conjunction with quarry.
 (†) Did not ship in 1943.

Granite

NOVA SCOTIA—		
Bower, A. R.	Box 255, Shelburne	Shelburne.
Dauphinee, W. T. (x)	Shelburne	Shelburne.
N.S. Department of Highways	Halifax	Various.
Rice Bros.	Lawrencetown	Nictaux West.
Shaw, Wm. (for W. H. Nixon) (x)	Williamstown	Nictaux West.
Shelburne Granite Works (x) (†)	Shelburne	Birchtown.

THE STONE QUARRYING INDUSTRY—Continued

Granite—Concluded

Name	Head office address	Location
NEW BRUNSWICK—		
Granite Street Pavement & Construction Co. Ltd. (x)	Box 1137, Saint John	Hampstead.
Mooney, B., & Sons (x)	49 Canterbury St., Saint John	Hampstead.
Spinney, Stephen, Estate of	St. George.	St. George.
QUEBEC—		
Anderson, Jas.	Box 125, Beebe.	Beebe.
Bérubé, Lucien (x)	Brownsburg.	Chatham Tp.
Bolduc, Antonio	St. Sébastien	Beauce.
Bourbonnais, J. P.	Dorion-Vaudreuil	Rigaud.
Brodies Ltd. (x)	1070 Bleury St., Montreal	Graniteville, Guenette, and Mount Johnson.
Bullock, W. W.	Graniteville.	Stanstead Co.
Cie de Marbre & Tuile de Quebec	181 rue St. Jean, Quebec	Ste. Cécile de Frontenac.
Cloutier, R. L. (x)	Beebe.	Beebe.
Delwaide & Goffin (x)	1365 rue St. Valier, Quebec	Chicoutimi.
Désy, Lorenzo	Almaville	Almaville.
Didier, Jos. Belley	330 St. Dominique, Jonquière	Jonquière.
Dubois, Honoré	Rivière à Pierre	Rivière à Pierre.
Dumas & Voyer (x)	Rivière à Pierre	Bois Tp.
Foundation Co. of Canada Ltd. (x)	Guy and Sherbrooke Sts., Montreal	Chicoutimi.
Frenette, P. E.	Rimouski	Rimouski.
Gaboriault & Niven	Box 65, Grenville	Argenteuil Co.
Gagnon, Arthur	1740-4ème rue, Grand'Mère	Grand'Mère.
Granit National Ltée (x)	St. Joseph d'Alma	St. Joseph d'Alma.
Grenier, Elie	Glenada	Glenada.
Lacasse & Boulais	Box 23, Beebe	Beebe.
Lambert, Alcide	Shawinigan Falls	Ste. Flore.
Maltais, Chas.	98 rue St. Joseph, St. Joseph d'Alma	St. Joseph d'Alma.
Massicotte, Lucien	504 Notre Dame, Cap de la Madeleine	La Tuque.
McNamara Construction Co. (x)	42 Industrial St., Leaside, Ont.	Long Point of Mingan.
Perron, Arthur	Rivière à Pierre	Rivière à Pierre.
Quebec North Shore Paper Co.	680 Sherbrooke St. W., Montreal	Baie Comeau.
St. Bruno Quarry & Paving Co. Ltd.	636 Ave. Querbes, Outremont	Chambly Co.
Scotstown Granite Co. Ltd. (x)	660 St. Catherine St., Montreal	Lingwick Tp.
Silver Granite Co. Ltd. (x)	2331 Provençal, Montreal	St. Samuel Station.
Société d'Entreprises Générales Ltée.	Amos	Amos.
Wilkinson, Frank L.	Beebe	Stanstead Co.
ONTARIO—		
Building Products Ltd. (x)	Box 6063, Montreal, Que.	Madoc.
Curran & Briggs Ltd.	61 Haverson Blvd., Toronto	Rancroft.
Fort William, City of	City Hall, Fort William	Mt. McKay.
Horne, Wm., Granite Quarries (x)	Butler, via Ignace	Butler.
Ontario Rock Co. Ltd.	2 College St., Toronto 2	Belmont Tp.
MANITOBA—		
Winnitoba Marble Co. (x) (†)	1180 Wall St., Winnipeg	Hawk Lake.
BRITISH COLUMBIA—		
B.C. Monumental Works Ltd. (x)	27 Kingsway, Vancouver	Granite Island.
Canadian National Railways	Montreal, Que.	Various.
Canadian Pacific Railways	Montreal, Que.	Various.
Gilley Bros. Ltd.	902 Columbia St., New Westminster	Ascroft.
Nelson, City of	City Hall, 501 Front St., Nelson	Granite Island.
Nelson Granite & Monumental Co.	505 Front St., Nelson	Kootenay District.
Trail, City of	1394 Pine Ave., Trail	Nelson.
Vancouver Granite Co. Ltd.	308 Pacific Bldg., Vancouver	West Kootenay.
Wilson, Jas. G. (x)	Sirdar	Nelson Island.
		Sirdar.

Limestone

NOVA SCOTIA—		
Dillman, Thos. (x)	Admiral Rock	Admiral Rock.
Dominion Steel & Coal Corp.	Sydney	Point Edward.
Eastern Lime Co. (x)	Windsor	Windsor.
Kirkpatrick, Robie	Kirkhill	Kirkhill.
McVicar & McDonald (†)	Bailey's Brook	Doctors Brook.
Mersey Paper Co. Ltd.	Liverpool	East River.
Mosher, O. P. & Sons	Upper Musquodoboit	Musquodoboit.
Nairn, J. S. (Dolomite)	24 Whitney Ave., Sydney	Scotch Lake.
North Inverness Lime Crushing Association (†)	Grand Etang	North Inverness District.
Nova Scotia Department of Agriculture	Truro	Various.
Nova Scotia Department of Highways	Halifax	Various.
Smiley, Howard (†)	Newport	Upper Newport.
Windsor Foundry (x)	O'Brien St., Windsor	Manner Point.

THE STONE QUARRYING INDUSTRY—Continued

Limestone—Concluded

Name	Head office address	Location
NEW BRUNSWICK—		
Alward, R. M.	Havelock	Havelock
Brookville Manufacturing Co.	Brookville	Brookville
Saint John Lime Co. (†)	Brookville	Brookville
Snowflake Lime Ltd.	3 Pokiok Rd., Saint John	Saint John
QUÉBEC—		
Aluminum Company of Canada Ltd.	1700 Sun Life Bldg., Montreal	Chicoutimi
Andorno, Jean (x)	Cap St. Martin	Cap St. Martin
Assels, J. G.	Port Daniel Centre	Clemville
Beaudry, J. P.	41 rue Taché, Joliette	Joliette
Bédard, Jean, Ltd.	St. Martin	St. Martin
Boucher, Louis	Gaspé Percé	Gaspé Percé
Boucher, Téléphore	Notre Dame de la Salette	Notre Dame de la Salette
Bourget, John D.	Deforceville	Deforceville
Canada Cement Co. Ltd.	Box 290, Station B, Montreal	Hull
Canadian Quarries Co.	10 Ouest, St. Jacques, Montreal	Ville St. Michel
Carrière de Cap St. Martin	636 Ave. Querbes, Outremont	Cap St. Martin
Carrière Château Engr.	Château Richer	Château Richer
Carrière Gravel Ltée	Château Richer	Château Richer
Carrière Pointe Claire	Dorion-Vaudreuil	Beaconsfield
Carrière St. Barthélemi	St. Barthélemi	St. Barthélemi
Carrière St. Dominique Ltée (x)	555-16ème Ave., St. Hyacinthe	St. Dominique
Carrière St. Maurice Ltée	1293 rue Hart, Trois Rivières	St. Louis de France
Carrière Trois Rivières Ltée (x)	St. Louis de France	St. Louis de France
Charbonneau, L., & Cie	St. François de Sales	Laval Co.
Cie de Construction de Roberval Ltée	Roberval	Roberval
Couture, L. P.	Ste. Anne des Monts	Ste. Anne des Monts
Department of Justice	Ottawa	St. Vincent de Paul
Deschambault Quarry Corp. (x)	56 rue St. Pierre, Que.	St. Marc
Dominion Lime Ltd. (x)	Lime Ridge	Lime Ridge
Drouin, Belonnie	Ste. Justine	Ste. Justine
Dufresne Engineering Co.	1832 Blvd. Pie IX, Montreal	Rivière des Prairies
Durocher, Cyrille	11021 Notre Dame E., Montreal	Montreal East
Eucher, Willie Tremblay	Ste. Anne de Chicoutimi	Chicoutimi
Filion, Aldege	Lachute	Lachute
Fortin, Camille	Chambord, Lac St. Jean	St. Jean
Gagné, Octave	St. Ulric	St. Ulric
Gagnon & Leclerc	St. Joachim	St. Joachim
Gaspesian Fertilizer Co.	Port Daniel E.	Port Daniel E.
Gauthier, Jos. O. (x)	St. Marc des Carrières	St. Marc des Carrières
Gauthier, René	7657 Henri Julien, Montreal	Bélanger Tp.
Gingras & Frère Ltée	St. Marc des Carrières	St. Marc des Carrières
Gosselin, A.	St. Laurent	St. Laurent
Gouin, J. A.	Box 240, Trois Rivières	St. Marc des Carrières
Highway Paving Co.	6301 Park Ave., Montreal	Chicoutimi
Kennedy Construction Co. Ltd.	407 McGill St., Montreal	Actonville
Lagace Quarry	130 Labelle Blvd., Quebec	St. Martin
Lakeshore Construction Co.	136 Cartier Ave., Pointe Claire	Pointe Claire
Landry, J. B. A.	St. André-Matapédia	St. André
Lapan, Frank Ltd.	2805 Lacordaire St., Montreal	Montreal
Larouche, J. B. (x)	Baie St. Paul	Baie St. Paul
La Salle Products Ltd.	159 Jean-Talon W., Montreal	Ville St. Michel
Laurentian Stone Co. Ltd.	195 Nicholas St., Ottawa, Ont.	Wrightsville
Leclerc, J. J.	Drapeau	Drapeau
Les Amendements Calcaires de Rivière Bleue (x)	Rivière Bleue	Témiscouata Co.
Martineau Fils Ltée (x)	517 Marie Anne E., Montreal	Pont Viau, Montreal
Mercure, Camille	555-16ème Ave., St. Hyacinthe	St. Dominique
Mier, R. H. Co. Ltd.	Room 719, Sun Life Bldg., Montreal	St. Laurent and Bélanger Village
Montreal Quarry & Cut Stone Co.	2020 Union Ave., Montreal	Côte St. Michel
National Quarries Ltd.	6301 Park Ave., Montreal	Côte St. Michel
Naud, Eugene	Hamelin	St. Marc des Carrières
Quimet, Eugene	St. Jean	St. Jean
Paquette, Lévis	Cap St. Martin	Cap St. Martin
Pelletier, Jos. E.	Ste. Anne des Monts	Ste. Anne des Monts
Pierre & Chaud Ltée	St. Marc des Carrières	St. Marc des Carrières
Poirier, Edgar	St. Siméon	St. Siméon
Quebec Department of Highways	Quebec	Various
Roux, Louis	Cowansville	Cowansville
Rousseau, T. E.	105 Côte de la Montagne, Quebec	Val Brilliant, New Carlisle
St. Francis Rock Products & Equipment Ltd.	St. Laurent	St. Laurent
St. Laurent Stone Products & Supplies Ltd.	St. Laurent	Laval Co.
Shawinigan Chemicals Ltd.	Power Bldg., Montreal	Bedford
Société Co-Opérative Agricole	St. Godefroi	St. Godefroi
Standard Clay Products Ltd.	Box 189, St. Johns	St. Johns
Standard Lime Co. Ltd.	Joliette	St. Paul de Joliette
Syndicat Co-Opérative Carrière Ferme Neuve	Ferme Neuve	Ferme Neuve
Syndicat de Broyage de Lévis	St. Joseph de Lévis	St. Joseph de Lévis
Trappist Fathers	Village des Pères	Village des Pères
Tremblay, Louis P.	Matane	Matane
Tremblay, Nap.	31 rue Joffre, Hull	Hull

THE STONE QUARRYING INDUSTRY—Continued

Limestone—Concluded

Name	Head office address	Location
QUEBEC—Continued		
Turotte & Asselin.....	370 Dorchester, Quebec.....	Château Richer.
Union des Carrières & Pavages Ltée.....	42-21ème Ave., Quebec.....	Charlesbourg.
Varin, Jos.....	3275 St. Michel, Montreal.....	St. Michel.
Verreault, Elz.....	194 Dupont, Quebec.....	Giffard.
Viau, Paul.....	340 Blvd. du Havre, Valleyfield.....	Valleyfield.
ONTARIO—		
Bonter Marble & Calcium Co. Ltd.....	Box 61, Marmora.....	Marmora.
Bonter, W. F.....	Malone.....	Malone.
Brunner, Mond Canada, Ltd.....	Bank of Commerce Bldg., Toronto.....	Anderdon Tp.
Canada Cement Co. Ltd.....	Box 290, Station B, Montreal, Que.....	Thurlow Tp.
Canadian Crushed Stone Ltd.....	72 Sun Life Bldg., Hamilton.....	Dundas and Hagersville.
Chemical Lime Co. Ltd.....	Beachville.....	Oxford Co.
Cook, J. S.....	Warton.....	Amabel Tp.
Gypsum, Lime & Alabastine Canada, Ltd.....	Paris.....	Beachville, Hespeler and Milton.
Hagersville Quarries Ltd.....	Hagersville.....	Hagersville.
Haldimand Quarries & Construction Ltd.....	137 Wellington St. W., Toronto.....	Hagersville.
Innerkip Quarries Ltd.....	2700 Dufferin St., Toronto.....	Innerkip.
Jamieson Lime Co.....	Renfrew.....	Horton Tp.
Johnson Bros. Co. Ltd.....	37 Market St., Brantford.....	Walpole Tp.
Kingston Penitentiary (x).....	Box 22, Kingston.....	Portsmouth.
Kirby, S.....	215 Sussex St., Ottawa.....	Gloucester Tp.
Kirkfield Crushed Stone Ltd.....	2700 Dufferin St., Toronto.....	Kirkfield.
Lapierre, M. C.....	1949-8th Ave., Owen Sound.....	Owen Sound.
Law, R. E., Stone Ltd.....	Port Colborne.....	Port Colborne.
Limestone Products Ltd.....	1109 Millwood Rd., Toronto.....	N. Orillia Tp.
Marlhill Mines Ltd. (x).....	Allanburg Rd., Thorold.....	Thorold.
McDonald, A. G.....	Bronte.....	Bronte.
McGinnis & O'Connor.....	394 King St. E., Kingston.....	Barriefield.
Noranda Mines Ltd.....	1600 Royal Bank Bldg., Toronto 1.....	Haileybury.
North American Cyanamid Ltd.....	Niagara Falls.....	Ingersoll.
Ontario Department of Highways.....	Parliament Bldgs., Toronto.....	Various.
Ontario Rock Co. Ltd.....	2 College St., Toronto 2.....	Belmont and Methuen Tps.
Pembroke, Corp. of.....	Pembroke.....	Pembroke.
Peterborough, City of.....	Peterborough.....	Peterborough.
Queenston Quarries Ltd. (x).....	72 Sun Life Bldg., Hamilton.....	St. Davids.
Walker Bros.....	Thorold.....	Stamford Tp.
Wehman, John.....	578 Division St., Kingston.....	Kingston Tp.
Welland Crushed Stone & Building Co. Ltd.....	Niagara Falls.....	Stamford Tp.
MANITOBA—		
Building Products & Coal Co. Ltd.....	111 Christie St., Winnipeg.....	Inwood.
Gillies Quarries Ltd. (†).....	Richards & Spruce Sts., Winnipeg.....	Garson and Stonewall.
McArdle, L. A. K.....	Mafeking.....	Mafeking.
Tyndall Quarry Co. Ltd. (x).....	1591 Erin St., Winnipeg.....	Garson.
Winnipeg, City of.....	223 James Ave., Winnipeg.....	Stoney Mountain.
Winnipeg Supply & Fuel Co. Ltd.....	812 Boyd Bldg., Winnipeg.....	Moosehorn and Stonewall.
ALBERTA—		
Loders Lime Co. Ltd.....	Kananaskis, Exshaw P.O.....	Kananaskis.
Summit Lime Works Ltd.....	Box 273, Lethbridge.....	Lethbridge.
BRITISH COLUMBIA—		
Agostinelli & Vannuchi.....	957 Rossland Ave., Trail.....	Fife.
Beale Quarries Ltd.....	744 W. Hastings St., Vancouver.....	Van Anda.
British Columbia Department of Highways.....	Victoria.....	Various.
British Columbia Pulp & Paper Co. Ltd.....	Bank of Nova Scotia Bldg., Vancouver.....	Nanaimo.
Canadian Pacific Railways.....	Montreal, Que.....	Golden.
Christensen, P. (Koeys Lime Quarries).....	Namu.....	Namu.
Fernie, City of.....	Fernie.....	Fernie.
Pacific Lime Co. Ltd.....	744 W. Hastings St., Vancouver.....	Texada Island.

Marble

QUEBEC—		
Mab Ltd.....	98 Dupont, Que.....	St. Joseph de Beauce.
Missisquoi Stone & Marble Co. Ltd. (x).....	Phillipsburg.....	Phillipsburg.
White Grit Co.....	120 Strathcona Ave., Ottawa, Ont.....	Portage du Fort.
ONTARIO—		
Connolly Marble, Mosaic & Tile Co. Ltd. (†).....	316 Dupont St., Toronto.....	Madoc Tp.
Silverstone Black Marble Quarries Ltd.....	328 Waverley St., Ottawa.....	St. Albert.
Stockloser, Karl.....	Box 13, Madoc.....	Eldorado.
White Star Mine (Bolender Bros.).....	Haliburton.....	Haliburton.
BRITISH COLUMBIA—		
Marble & Associated Products.....	507 Ellice St., Victoria.....	Malahat.

THE STONE QUARRYING INDUSTRY—Concluded

Sandstone

Name	Head office address	Location
NOVA SCOTIA—		
Fairview Crushed Stone.....	637A Gottingen St., Halifax.....	Halifax.
Nova Scotia Department of Highways.....	Halifax.....	Various.
Wallace Quarries Ltd.....	Wallace.....	Wallace.
NEW BRUNSWICK—		
Read Stone Co. (x) (†).....	Sackville.....	Stonehaven.
Smith, E. A. (x).....	Shediac.....	Shediac.
QUEBEC—		
Blais, Jos.....	32 Mont Marie Ave., Lévis.....	St. Romuald.
Gagnon, L. P.....	St. David de Lévis.....	St. David de Lévis.
Rousseau, T. E.....	105 Côte de la Montagne, Quebec.....	Val Brilliant.
Ste. Marie, U.....	Beauport.....	Beauport.
Sherbrooke, City of.....	Sherbrooke.....	Sherbrooke.
Simard, Adjutor.....	Pointe au Pic.....	Pointe au Pic.
ONTARIO—		
Campbell Sandstone Quarries Ltd.....	Box c19, Westboro.....	Bells Corners.
Norton, A. W.....	Limehouse.....	Limehouse.
Sinfield, E. W.....	Terra Cotta.....	Terra Cotta.
Sykes Quarries.....	Church St., Georgetown.....	Glen Williams.
BRITISH COLUMBIA—		
Consolidated Mining & Smelting Co.....	Trail.....	Fort Steele.

Slate

QUEBEC—		
Williamson & Crombie.....	Kingsbury.....	Kingsbury
BRITISH COLUMBIA—		
Brown, O. M.....	1903 Lansdowne Rd., Victoria.....	Kapoor.
Richmond, George W.....	4190 Blenheim St., Vancouver.....	Howe Sound.

PRODUCERS OF ROCK WOOL

Name	Address
Canadian Gypsum Company Ltd.....	Weston, Ontario.
Canadian Johns Manville Co. Ltd.....	Asbestos, Quebec.
Gypsum, Lime & Alabastine, Canada, Ltd.....	Caledonia, Ontario.
Insulation Products Ltd.....	Todmorden, Toronto, Ontario.
Spun Rock Wools Ltd.....	Thorold, Ontario.
Vacuum Wool Limited.....	Ladysmith, British Columbia.

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CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL STATISTICS

ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR

1944

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Canada Statistics

SUPPLEMENT TO ANNUAL REPORT
ON THE
MINERAL PRODUCTION OF CANADA
1944

In preparing the manuscript for the above-mentioned report, the chapter on the Stone Industry was inadvertently omitted. This supplement should be inserted after page 287 in order to complete your copy.



THE STONE INDUSTRY IN CANADA, 1944

The Stone Industry in Canada comprises two main divisions: 1. *The Stone Quarrying Industry*, including quarries and dressing works operated in conjunction with quarries, and 2. *The Stone Products Industry*, comprising the operations of firms having no quarries but who operate dressing works where stone for building and monumental purposes is cut, polished or otherwise finished. In the Census of Industry, statistics on the stone quarrying industry are included under Mining, while statistics of the stone products industry are included under manufactures. For convenience, this report carries data for both of these industries.

Production by these industries during the year totalled \$9,698,164, which figure includes the value of the quarry output and the value added by manufacturing in the secondary stone industry. Salaried employees and wage-earners employed in 1944 numbered 3,018 and their combined earnings amounted to \$4,580,951.

The two industries are treated separately in the following review.

1.—PRIMARY PRODUCTION—THE STONE QUARRYING INDUSTRY

The kinds of stone quarried in Canada include granite (trap rock, syenite and other igneous rock), limestone, marble, sandstone, and slate. Stone of almost every known variety occurs in Canada; rocks of the igneous areas of British Columbia, Manitoba, Ontario, Quebec and the Maritime Provinces exhibit a wide range of physical characteristics, some varieties being especially noted for their richness of colour and beauty of crystallization. The sedimentary rocks, including limestones, sandstones and marbles are quarried at various points in Canada. The products from quarries operating in these different formations not only yield high class structural and decorative materials but provide the chemical and other allied industries with many of their increasing requirements.

The gross value of all varieties of new stone produced in Canada during 1944 totalled \$7,159,177 compared with \$7,964,179 in 1943. The tonnage shipped in 1944 included 5,565,286 tons of limestone valued at \$5,528,459; 269,964 tons of granite (igneous rocks) valued at \$1,303,790; 146,766 tons of sandstone valued at \$223,453; 11,829 tons of marble valued at \$85,374 and 1,147 tons of slate worth \$18,101. Of the total value of domestic stone produced in 1944, quarries in the province of Quebec contributed 46.6 per cent, Ontario 40.6 per cent, and Nova Scotia 3.1 per cent.

The number of firms in the stone quarrying industry in 1944 totalled 405; employees numbered 2,164; salaries and wages paid aggregated \$3,154,689 and the cost of fuel, electricity and process supplies used amounted to \$1,497,880.

Table 1.—Production (Sales) of Stone from Canadian Quarries, by Kinds and by Provinces, 1943 and 1944

Province	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1943						
Nova Scotia.....	tons 703	174,933		72,232		247,868
	\$ 28,407	264,197		128,265		420,869
New Brunswick.....	tons 1,522	51,406		655		53,583
	\$ 15,856	128,915		2,600		147,371
Quebec.....	tons 634,920	2,709,320	7,596	75,298	191	3,427,325
	\$ 1,164,463	2,696,205	41,720	94,388	191	3,996,967
Ontario.....	tons 79,582	3,114,460	4,167	7,818		3,206,027
	\$ 212,136	2,704,205	24,852	17,190		2,958,383
Manitoba.....	tons 37,974					37,974
	\$ 50,784					50,784
Alberta.....	tons 13,961					13,961
	\$ 47,899					47,899
British Columbia.....	tons 63,695	163,127	85	8,160	1,145	236,212
	\$ 101,210	213,544	1,450	8,160	17,542	341,906
Canada.....	tons 780,422	6,265,181	11,848	164,163	1,336	7,222,950
	\$ 1,522,072	6,105,749	68,022	250,663	17,733	7,964,179

(a) All igneous rocks included.

(b) Includes dolomite, also marl for agricultural purposes.

NOTE.—Not included in the above limestone statistics are 1,865,597 tons of limestone consumed in the cement industry in 1944 and 1,918,742 tons in 1943. Limestone used in the Canadian lime industry is also not included; it is estimated that approximately 1,571,451 tons of limestone were burned in the manufacture of lime in 1944 and 1,614,481 tons in 1943.

Table 1.—Production (Sales) of Stone From Canadian Quarries, by Kinds and by Provinces, 1943 and 1944—Concluded

Province	Granite (a)	Limestone (b)	Marble	Sandstone	Slate	Total
1944						
Nova Scotia.....tons	1,886	50,734		45,813		98,433
\$	37,532	123,613		63,968		225,113
New Brunswick.....tons	1,857	66,731		1,400		69,988
\$	47,504	165,258		31,425		244,187
Quebec.....tons	127,544	2,370,141	6,489	89,470	198	2,593,842
\$	830,238	2,349,177	50,569	104,629	198	3,334,811
Ontario.....tons	125,604	2,852,241	5,215	5,223		2,988 283
\$	307,497	2,549,402	32,650	20,431		2,909,980
Manitoba.....tons	357	31,572				31,929
\$	4,967	48,587				53,554
Alberta.....tons		12,726				12,726
\$		43,049				43,049
British Columbia.....tons	12,716	181,141	125	4,860	949	199,731
\$	76,052	249,373	2,155	3,000	17,903	348,483
Canada.....tons						
\$	269,964	5,565,286	11,829	146,766	1,147	5,991,992
	1,303,790	5,528,459	85,374	223,453	18,101	7,159,177

Table 2.—Production (Sales) of Stone(*) from Canadian Quarries, by Provinces, Showing Purposes for Which Used, 1944

For use as follows:	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Canada
1944								
Building stone—Rough.....	tons 372	80	7,275	3,414	245		1,436	12,822
\$	4,719	962	23,391	11,096	2,003		3,624	45,795
Dressed.....	tons 620	6,136	3,337	227				10,320
\$	31,890	261,228	47,325	9,964				350,407
Monumental and ornamental stone—Rough.....	tons 37	1,488	6,777				1,305	9,607
\$	552	11,625	96,552				13,800	122,529
Monumental and ornamental stone—Dressed.....	tons 349	188	5,200	174	120		304	6,335
\$	33,980	33,074	491,894	918	4,575		50,594	615,035
Flagstone.....	tons			1,315	27			1,342
\$				4,748	180			4,928
Curbstone.....	tons		200					200
\$			1,298					1,298
Paving blocks.....	tons		1,250	300				1,550
\$			7,874	600				8,474
Lining open-hearth furnaces.....	tons 8,930							8,930
\$	16,967							16,967
Chemical—								
Flux in iron and steel furnaces.....	tons 57	1,005	414,625	4,457	1,000	589		421,733
\$	110	854	373,334	7,480	2,500	975		385,234
Flux in non-ferrous smelters.....	tons 49,729	117,099	26,706	87,188		37,491		204,319
\$			391			24,406		138,300
Glass factories.....	tons 391	1,466				3,742		4,133
\$						5,613		7,079
Pulp and paper mills.....	tons 4,188	129,642	25,375	1,741		47,719		208,665
\$	7,748	179,815	82,986	1,913		101,675		374,137
Sugar refineries.....	tons 4,878		4,231					4,978
\$			244,592					4,231
Other chemical uses.....	tons 240,107					20,942		265,534
\$						21,264		261,371
Pulverized Stone—								
Whiting (substitute).....	tons 2,732					233		2,965
\$						2,996		19,607
Asphalt filler.....	tons 16,611		9,031	4,153		966		14,427
\$	2,493		32,910	14,853		4,830		55,086
Dusting coal mines.....	tons 3,030					473		3,503
\$						12,120		15,313
Agricultural purposes and fertilizer plants.....	tons 41,454	62,467	171,637	32,074	1,833	1,514	5,966	316,945
\$	103,367	157,353	239,521	74,337	4,923	6,056	15,485	601,042
Other uses.....	tons 80		10,547	2,282		23		12,932
\$			465	35,090	2,028	207		37,790
Crushed stone for manufacture of artificial stone.....	tons 172		82					254
\$			255					1,041
Roofing granules.....	tons 35,031					952		35,983
\$						17,975		144,110
Poultry grit.....	tons 73		1,910	8,318		3,440	1,466	15,207
\$	786		10,628	49,752		16,760	7,317	85,243
Stucco dash.....	tons 531		97				522	1,150
\$			3,439	582			5,314	9,335
Terrazzo chips.....	tons 1,327		1,465					2,792
\$			7,283	10,850				18,133
Rock wool.....	tons 7,130							7,130
\$				6,890				6,890
Rubble and riprap.....	tons 6,441	900	101,598	84,207	1,600		6,855	201,601
\$	10,949	1,425	88,722	80,683	1,810		4,234	187,823
Crushed stone—								
Concrete aggregate.....	tons 30,000		1,293,101	514,841	14,393			1,852,335
\$	33,300		1,152,845	400,144	14,403			1,600,692
Road metal.....	tons 10,500		382,773	1,030,303	4,443		70,239	1,498,258
\$	18,000		351,067	911,685	3,761		68,283	1,352,796
Railroad ballast.....	tons 424,077		442,094	561			2,310	869,042
\$			356,067	329,580	514		2,310	688,471
Total Canada.....	tons 98,433	69,988	2,593,842	2,988,283	31,929	12,726	199,791	5,994,992
 \$	225,113	244,187	3,334,811	2,909,980	53,554	43,049	348,483	7,159,177
Per cent of total.....	Quantity							
Value	1.64	1.17	43.27	49.85	0.53	0.21	3.33	100.00
	3.14	3.41	46.58	40.65	0.75	0.60	4.87	100.00

(*) Includes the production of slate and marl.

Table 3.—Production (Sales) of Stone From Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1943 and 1944

For use as follows:	Granite (a)	Lime- stone (b)	Marble	Sand- stone	Slate	Total
1943						
Building stone—Rough..... tons	1,754	4,014	79	2,680		8,527
Dressed..... tons	3,497	7,859	4,427	10,711		26,494
	\$ 3,143	5,314	73	25		8,560
	\$ 103,691	172,198	10,745	1,300		287,934
Monumental and ornamental stone—Rough..... tons	7,310					7,310
Dressed..... tons	116,735					116,735
	\$ 3,795	130				3,925
	\$ 398,828	4,700				397,528
Flagstone..... tons		1,185		1,057		2,242
	\$	1,185		4,693		5,878
Curbstone..... tons	327					327
	\$ 2,364					2,364
Paving blocks..... tons	800					800
	\$ 7,014					7,014
Lining open-hearth furnaces..... tons		20,246				20,246
	\$	20,647				20,647
Chemical—						
Flux in iron and steel furnaces..... tons		554,422	15			554,437
	\$	504,951	250			505,201
Flux in non-ferrous smelters..... tons		283,117				283,117
	\$	177,434				177,434
Glass factories..... tons		3,928	229			4,157
	\$	6,094	1,243			7,337
Pulp and Paper mills..... tons		215,382				215,382
	\$	374,880				374,880
Sugar refineries..... tons		11,180				11,180
	\$	9,503				9,503
Other chemical uses..... tons		260,953				260,953
	\$	255,772				255,772
Pulverized stone—						
Whiting (substitute)..... tons		2,905				2,905
	\$	17,760				17,760
Asphalt filler..... tons		22,530			214	22,744
	\$	83,348			1,712	85,060
Dusting coal mines..... tons		8,191				8,191
	\$	19,017				19,017
Agricultural purposes and fertilizer plants..... tons		271,036				271,036
	\$	533,217				533,217
Other uses..... tons		10,467	490			10,957
	\$	26,504	2,863			29,367
Crushed stone for manufacture of artificial stone..... tons		121	116			237
	\$	524	542			1,066
Roofing granules..... tons	6,921	320			871	8,112
	\$ 96,920	400			15,230	112,550
Poultry grit..... tons	3	12,996	5,208			18,207
	\$ 74	68,502	31,521			100,097
Stucco dash..... tons	5	717	682		60	1,464
	\$ 66	4,384	4,696		600	9,746
Terrazzo chips..... tons		148	1,344			1,492
	\$	444	7,762			8,206
Rock wool..... tons		13,237				13,237
	\$	12,660				12,660
Rubble and riprap..... tons	181,096	298,968	3,612	56,760	191	540,627
	\$ 105,644	244,821	3,973	64,296	191	418,925
Crushed Stone—						
Concrete aggregate..... tons	208,341	1,004,224		68,657		1,981,222
	\$ 258,078	1,856,337		83,474		1,727,889
Road metal..... tons	260,830	1,820,774		26,824		2,108,428
	\$ 430,592	1,480,948		77,969		1,989,509
Railroad ballast..... tons	6,092	838,676		8,160		852,928
	\$ 4,569	691,660		8,160		704,389
Total Canada (b)..... tons	780,422	6,265,181	11,848	164,163	1,336	7,222,950
	\$ 1,522,072	6,105,749	68,022	250,603	17,733	7,964,179

(a) Includes all igneous rock.

(b) Does not include limestone used in Canadian lime and cement industries but includes marl used for agricultural purposes.

Table 3.—Production (Sales) of Stone from Canadian Quarries, by Kinds, Showing Purposes for Which Used, 1943 and 1944—Concluded

For use as follows:	Granite (a)	Lime- stone (b)	Marble	Sand- stone	Slate	Total
1944						
Building stone—Rough.....	tons 4,260	4,770	142	3,650		12,822
	\$ 10,033	11,149	9,268	15,345		45,795
Dressed.....	tons 1,592	7,458	120	1,150		10,320
	\$ 83,485	214,037	18,135	34,750		350,407
Monumental and ornamental stone—Rough.....	tons 9,607					9,607
	\$ 122,529					122,529
Dressed.....	tons 6,041	120		174		6,335
	\$ 609,542	4,575		918		615,035
Flagstone.....	tons	907		435		1,342
	\$	1,336		3,502		4,928
Curbstone.....	tons 200					200
	\$ 1,298					1,298
Paving blocks.....	tons 1,235			315		1,550
	\$ 7,770			704		8,474
Lining open-hearth furnaces.....	tons	8,930				8,930
	\$	16,967				16,967
Chemical—						
Flux in iron and steel furnaces.....	tons	421,713	20			421,733
	\$	384,924	330			385,254
Flux in non-ferrous smelters.....	tons	204,319				204,319
	\$	138,300				138,300
Glass factories.....	tons	4,133				4,133
	\$	7,079				7,079
Pulp and paper mills.....	tons	208,665				208,665
	\$	374,137				374,137
Sugar refineries.....	tons	4,978				4,978
	\$	4,231				4,231
Other chemical uses.....	tons	265,534				265,534
	\$	261,371				261,371
Pulverized stone—						
Whiting (substitute).....	tons	2,915	50			2,965
	\$	18,807	800			19,607
Asphalt filler.....	tons	14,427				14,427
	\$	55,086				55,086
Dusting coal mines.....	tons	3,503				3,503
	\$	15,313				15,313
Agricultural purposes and fertilizer plants.....	tons 400	316,545				316,945
	\$ 2,825	598,217				601,042
Other uses.....	tons	12,502	430			12,932
	\$	35,925	1,865			37,790
Crushed stone for manufacture of artificial stone....	tons	82	172			254
	\$	255	786			1,041
Roofing granules.....	tons 33,039	1,995			949	35,983
	\$ 123,732	2,475			17,903	144,110
Poultry grit.....	tons 279	10,251	4,677			15,207
	\$ 2,800	53,930	28,513			85,243
Stucco dash.....	tons 4	565	581			1,150
	\$ 70	4,826	4,439			9,335
Terrazzo chips.....	tons	270	2,522			2,792
	\$	810	17,323			18,133
Rock wool.....	tons	7,130				7,130
	\$	6,890				6,890
Rubble and riprap.....	tons 29,265	153,892	3,115	15,131	198	201,601
	\$ 24,021	136,294	3,915	23,395	198	187,823
Crushed stone—						
Concrete aggregate.....	tons 54,476	1,751,849		46,010		1,852,335
	\$ 83,951	1,455,549		61,192		1,600,692
Road metal.....	tons 129,566	1,350,374		18,318		1,498,258
	\$ 231,734	1,090,968		30,094		1,352,796
Railroad ballast.....	tons	807,459		61,583		869,042
	\$	635,008		53,463		688,471
Total Canada (b).....	tons 269,964	5,565,286	11,829	146,766	1,147	5,994,992
	\$ 1,303,790	5,528,459	85,374	223,453	18,101	7,159,177

Table 4.—Production of Stone for Building Purposes, Chemical Use, Cement Manufacture, Concrete Aggregate, Road Metal and Railroad Ballast, 1935-1944

Year	Building stone (a)	For chemical purposes (b)	For concrete aggregate	For road metal	For railroad ballast	For cement manufacture (c)
1935.....	200,899 tons	537,799	804,719	1,976,363	351,802	818,443
	\$ 1,258,741	483,709	523,847	1,987,351	211,993	
1936.....	42,335 tons	615,207	1,014,145	1,903,927	784,081	1,180,368
	\$ 714,616	553,597	730,617	1,653,134	659,656	
1937.....	49,098 tons	693,947	1,497,655	3,169,136	642,248	1,465,168
	\$ 746,370	626,297	1,214,131	2,522,080	570,606	
1938.....	49,666 tons	551,737	981,739	2,721,922	86,019	1,388,689
	\$ 725,402	468,000	791,971	2,347,010	58,816	
1939.....	71,288 tons	577,278	1,344,636	2,131,306	600,266	1,407,099
	\$ 1,344,240	523,579	1,109,028	1,773,337	522,382	
1940.....	97,336 tons	725,685	2,673,078	2,300,613	896,408	1,784,291
	\$ 722,514	681,796	2,171,487	1,885,744	741,772	
1941.....	54,262 tons	965,690	2,581,583	2,958,613	446,505	2,113,618
	\$ 653,077	889,574	1,986,226	2,484,393	322,348	
1942.....	24,897 tons	1,236,044	2,924,737	2,275,706	683,317	2,186,248
	\$ 361,781	1,651,982	2,424,357	1,877,473	527,814	
1943.....	17,087 tons	1,329,226	1,981,222	2,108,428	852,925	1,994,202
	\$ 314,423	1,330,127	1,727,889	1,989,509	704,389	
1944.....	23,142 tons	1,109,362	1,852,335	1,498,258	869,042	1,939,900
	\$ 396,202	1,170,372	1,600,692	1,352,796	688,471	

(a) Does not include monumental or ornamental stone.

(b) Does not include limestone used in Canadian lime industry which totalled 1,571,451 tons in 1944.

(c) Includes shale in 1937-1943—Includes 13,821 tons shale in 1938; 27,241 tons in 1939; 18,347 tons in 1940; 26,837 tons in 1941; 30,498 tons in 1942; 75,460 tons in 1943 and 74,303 tons in 1944.

GRANITE**Table 5.—Production of Granite(*) in Canada, 1935-1944**

Year	Short tons	\$	Year	Short tons	\$
1935.....	326,354	1,126,287	1940.....	1,147,747	1,884,410
1936.....	941,743	1,319,313	1941.....	600,922	1,498,786
1937.....	1,135,099	1,827,433	1942.....	1,366,425	1,946,249
1938.....	705,307	1,379,417	1943.....	780,422	1,522,072
1939.....	1,102,395	2,119,501	1944.....	269,964	1,303,790

(*) Includes all igneous rock.

The following abstracts are from a report on granite prepared by the Bureau of Mines, Ottawa:

"The stone quarried consists of granite and related crystalline igneous rocks used for building decorative, ornamental, or constructional purposes. Producing properties are in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia. Large areas in Canada are underlain by granite and the prospects of finding stone suitable for its various uses are good.

"Granite for monumental use is produced in the Maritime Provinces and in Quebec, Ontario, Manitoba, and British Columbia. Prior to the war an appreciable amount of foreign stone, principally of the black and red varieties, was imported, mainly from Finland and Sweden. Black granite has been quarried in Canada, notably in the vicinity of Lake St. John, Quebec, and from quarries along the north shore of Lake Superior, and stone from these areas should find a ready market for monumental use. Other deposits of 'black granite' in the Maritime Provinces, Quebec, Ontario, and Manitoba show promise of yielding stone of good quality.

"Much of the granite produced in Canada is used for foundations for highways; for the permanent ballasting of railway roadbeds; for heavy aggregate in large concrete structures; for the filling of break-waters; and for bridge piers. Granite from quarries in Quebec has been used in the construction of public buildings in different parts of Canada, in competition with local stone. Most operations in which granite is used have been greatly curtailed during the war.

"Some granite is being imported from the United States for monumental use, but Canadian granite is being used to an increasing extent for this purpose. At present the so-called black granite and the grey varieties seem to be in most demand for monuments, although the various

shades of reds are still popular in many districts. Canadian producers should give careful study to the market possibilities of a monumental stone, especially of the black and red varieties.

"In the building trade, coloured granites are being used to an increasing extent in the form of thin polished slabs for trim for buildings in which the main colour scheme calls for contrast.

"Canadian granites are suitable for all the purposes for which granite is used, and with persistent advertising the industry is likely to prosper."

LIMESTONE

Table 6.—Production of Limestone(*) in Canada, 1935-1944

Year	Short tons	\$	Year	Short tons	\$
1935.....	3,631,665	3,253,573	1940.....	6,108,591	5,126,075
1936.....	3,731,548	3,143,872	1941.....	7,151,049	6,057,727
1937.....	5,542,806	4,673,942	1942.....	6,442,583	6,468,525
1938.....	4,288,507	3,864,619	1943.....	6,265,181	6,105,749
1939.....	4,149,589	3,817,551	1944.....	5,565,286	5,528,459

(*) Includes dolomite and marl; production of marl totalled 23,026 tons in 1942; 22,913 tons in 1943, and 19,848 tons in 1944.

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Limestone is the most widely used of all rocks because of the great variety and importance of its industrial uses and because of its widespread occurrence. It is quarried in all provinces of Canada except Prince Edward Island and Saskatchewan, but by far the greater part of the production comes from Ontario and Quebec. The present production of limestone for all purposes, including the manufacture of lime and cement, constitutes about 90 per cent of the total production of Canadian stone.

"Limestone is available in great bedded formations and in massive highly metamorphosed deposits, the former being much more common and yielding most of the production. In chemical composition the deposits range from pure high-calcium limestone through magnesian limestone to dolomite. Large deposits of brucite limestone and magnesitic dolomite are being worked.

"Of significance in connection with future production of pure limestone is the progress being made in beneficiation whereby siliceous material is in part removed from impure limestone by flotation. This method of purifying limestone is now in use at several Portland cement plants in various parts of the world, and it is likely to be more widely used in the future as it permits utilization of certain deposits which, though advantageously situated, contain impurities that hitherto spoiled the usefulness of the deposit.

"Limestone is widely distributed and is quarried on a large scale in all industrial countries. Rarely is there much international trade in it, but limestone for use in certain large consuming centres in Canada can be obtained more cheaply from abroad and considerable quantities are imported for use as blast furnace flux, for road metal, and for use in some pulp mills in Ontario near the International boundary. Comparatively small tonnages are exported to the United States for use in agriculture and in sugar refineries. No separate record is maintained of the trade in limestone.

"For industrial use limestone is marketed in a variety of forms ranging from huge squared blocks of dimension stone used in construction, to extremely fine dust used chiefly as a mineral filler. For certain uses (in the wood pulp industry, for example) the limestone as quarried requires little or no processing, but most of the output is crushed and screened for use as road metal, concrete aggregate, railroad ballast, and as flux in metallurgical plants. Large quantities are used in the manufacture of Portland cement, lime, and various chemical products. Most of the limestone used in chemical and metallurgical industries is of the high-calcium variety, but dolomite is rapidly increasing in importance as an industrial raw material.

"Argillaceous dolomite is used for the manufacture of rock wool, a widely used insulating material. The value of rock wool and slag wool produced in 1944 by five Canadian plants in Ontario and Quebec was \$1,617,420 compared with \$1,721,141 in 1943. The decreased production was caused mostly by shortages in labour and materials. Two new plants, one in Saskatchewan and one in New Brunswick, were built during 1944 but did not come into production until 1945.

"Pure dolomite is now an important source of magnesia and magnesium metal. The metal is recovered directly from calcined dolomite by reduction with ferrosilicon, and indirectly by reacting calcined dolomite with sea-water or with magnesium chloride brine, thereby forming magnesium hydroxide that is converted into the chloride, from which after dehydration, magnesium is recovered by electrolysis. High-calcium lime can be used in place of dolomitic lime for precipitating magnesium hydroxide from sea-water and brine, but where the dolomitic lime is used the yield of magnesia is increased by the magnesia content of the latter. Dolomite is the raw matter from which basic magnesium carbonate and magnesia are made by the Pattinson process. Dead-burned dolomite is widely used as a refractory material in the steel industry.

"Magnesitic dolomite is used in Quebec for the production of refractory products; brucitic limestone is processed for the production of magnesia and hydrated lime.

"The use of limestone in agriculture is capable of extensive development. Though the necessity of applying limestone or lime to agricultural land to maintain or increase soil fertility has been emphasized for many years, the quantity so used in Canada is small.

"Limestone in blocks or large dimensions for sawing into building stone is quarried in Quebec, Ontario, and Manitoba. The quarry centres in Quebec for this heavily bedded limestone are at St. Marc des Carrières in Portneuf county, and in the vicinity of Montreal. At both localities a grey limestone is obtained. In Ontario, silver-grey limestone and smaller quantities of buff, and of variegated buff and grey limestone, are quarried near Queenston in the Niagara Peninsula. At Longford Mills, near Orillia, buff, silver-grey, and brown limestone suitable for building stone and marble is available, but has not been quarried for the past several years. The Manitoba quarries are near Tyndall and yield mottled buff, mottled grey, and mottled variegated limestone. They have been inactive for the past several years.

"In addition to the large quarries, the products of which normally have a wide shipping range, small quarries producing building stone for local use are worked near Quebec City, Montreal, and Hull in the province of Quebec; and at Ottawa, Kingston, and Warton in Ontario. Rubble is their chief product.

"Some of the quarry companies market stone in all stages of manufacture, from the mill block to elaborately carved material; others sell stone only in the mill block. Waste material is utilized for crushed stone, rubble, riprap, flagging, chemical and metallurgical purposes, and for lime manufacture.

"The small production in 1944 reflects the wartime curtailment in construction of buildings of the type requiring cut stone. Most of the quarries were inactive during 1944 and a part of the shipments made were from stock. The rise in imports was occasioned in part by the difficulty of securing labour for the short periods of quarry operation necessary to supply the small demand for stone not already in stock. As a result, many of the quarries remained closed and the small demand was supplied by imported stone.

"Prices of limestone in the mill block, f.o.b. quarry, have remained almost stationary in recent years, and range from 50 cents to \$1 a cubic foot, depending on the size of block and grade of stone.

"There is likely to be a good demand for structural limestone when construction for civilian requirements gets under way, because the construction of a great many necessary buildings for which Canada limestone is specified has been deferred until after the war."

MARBLE

Table 7.—Production of Marble in Canada, 1935-1944

Year	Short tons	\$	Year	Short tons	\$
1935.....	15,975	85,369	1940.....	13,739	75,409
1936.....	22,866	169,698	1941.....	17,649	126,081
1937.....	21,642	88,595	1942.....	13,824	88,209
1938.....	19,375	87,274	1943.....	11,848	68,022
1939.....	14,124	200,054	1944.....	11,829	85,374

The following abstracts are from a report prepared by the Bureau of Mines, Ottawa:

"Marble quarries are operated in Quebec, Ontario, Manitoba, and British Columbia. The

products include squared blocks for sawing into slabs, and broken marble for use as rubble and for making artificial stone, terrazzo chips, stucco dash, poultry grit, marble flour, and whiting substitute. Waste from some of the quarries is sold for chemical and metallurgical uses and for road metal.

"In Quebec, several varieties of clouded grey marble and also a black marble are available in the quarries of Missisquoi Stone and Marble Company, Limited at Philipsburg. Brown marble used for counters and wainscoting is obtained from the building-stone quarries in the Trenton Limestone at St. Marc des Carrières, Portneuf county. White dolomite is quarried and crushed by Canadian Dolomite Company, Limited at Portage du Fort, Pontiac county, for making artificial stone, terrazzo chips, stucco dash, and various minor products.

"In Ontario, black marble in beds up to 40 inches thick is quarried at St. Albert, near Ottawa, by Silvertone Black Marble Quarries, Limited, Ottawa. Buff, red, white, green, and black marbles are quarried north of Madoc by Karl Stocklosar and by Connolly Marble, Mosaic and Tile Company, Limited, for use as terrazzo.

"In Manitoba, a number of highly coloured marbles are available, but there is only a small production of red and buff marble by Winnitoba Marble Quarries, Winnipeg, from its quarry at Fisher Branch to supply building rubble and terrazzo chips.

"In British Columbia there are many deposits of marble, but there, is at present only a small production of white marble, and Associated Products, Victoria, from a quarry at Malahat, and by Beale Quarries Limited, Van Anda, Texada Island.

"Many deposits of beautifully coloured marble are known, but have never been fully investigated, chiefly because in the past the demand in Canada for marble of any one colour, other than for a staple variety, such as white, was comparatively small.

"There is a wide range in the price of marble depending on the quality and rareness of colouring.

"The war has adversely affected the marble industry because most of the wartime buildings have been of the industrial type in which little or no standing marble has been used. Few of the quarries were in active operation in 1944 and such shipments of block or slab marble as were made were from stock. There has, however, been an increase in the demand for terrazzo material, most of which previously originated in Europe. Several of the Canadian quarry operators have added equipment for the production of both terrazzo chips and poultry grit from waste marble, and a good range of colours is now available in domestic terrazzo chips. In view of the large accumulation of building construction to be proceeded with after the war it is expected that a good demand for Canadian marble will materialize in the near future".

SANDSTONE

Table 8.—Production of Sandstone in Canada, 1935-1944

Year	Short tons	\$	Year	Short tons	\$
1935.....	342,824	838,005	1940.....	176,475	305,543
1936.....	285,508	495,856	1941.....	169,885	305,528
1937.....	235,165	343,871	1942.....	153,865	236,810
1938.....	101,854	218,405	1943.....	164,163	250,603
1939.....	176,265	331,830	1944.....	146,766	223,453

Canadian sandstone has been utilized extensively in the construction of many important public buildings in Canada and is finding increasing favour as a material in the construction of the better type home. The rock occurs in Canada in a variety of colours, including white, reddish brown, yellow and grey. Shipments of sandstone were made in 1944 from quarries located in all of the provinces with the exception of Prince Edward Island, Manitoba, Saskatchewan and Alberta.

The greater part of the crude output in 1944 was employed as rubble and riprap and in the crushed state for concrete, highway construction and railroad ballasting. Sandstone in British Columbia, New Brunswick and Nova Scotia has been employed in the manufacture of abrasive wheels and sharpening stones; such production is included with natural abrasives manufactures. Crude, crushed or ground quartzite sold for fluxing purposes or as silica sand is included under quartz as production.

SLATE

Table 9.—Production of Slate in Canada, 1935-1944

Year	Short tons	\$	Year	Short tons	\$
1935.....	1,129	4,329	1940.....	1,113	7,522
1936.....	1,247	5,414	1941.....	1,296	12,562
1937.....	900	5,519	1942.....	1,369	16,801
1938.....	979	6,311	1943.....	1,336	17,733
1939.....	1,149	6,760	1944.....	1,147	18,101

Canadian slate production in 1943 came entirely from the provinces of Quebec and British Columbia and represented shipments of the stone in the form of granules for roofing purposes, riprap and asphalt filling. No Canadian deposits of slate suitable for the production of high grade roofing slates or shingles have been reported as being under development in recent years.

WHITING SUBSTITUTE

"Whiting substitute, as the name implies, is a material that may be used in place of chalk whiting, all of which originates in England or in continental Europe. It may be made from white limestone or white marble, marl, lime, or from the waste calcium carbonate sludge resulting from the manufacture of caustic soda.

"The products made from white marble or white limestone are pulverized to various degrees of fineness ranging from 200 to 400 mesh. The marbles at present used contain very little magnesium carbonate, though in the past a whiting substitute made from white dolomite was produced in Eastern Canada for making putty, and there seems to be no good reason why a dolomitic whiting substitute would not be equally as suitable as calcite for numerous purposes.

"The principal differences between whiting made from chalk and whiting substitute made from marble or limestone are that the latter is usually whiter, has a low capacity for absorbing oil, and the individual particles are subangular rather than rounded. Most of the whiting substitute made in Canada is made from white marble.

"Marl suitable for making whiting substitute should be white or nearly so, be nearly free from grit and clayey material, and have a very low content of organic matter. This last-named constituent, which is present to some extent in all deposits of marl, renders the product unsuitable for use as a filler in products such as putty and paint where it will come in contact with oils. The oil-absorptive capacity of whiting substitute made from marl is usually greater than that of whiting but in other respects the physical characteristics of the two products are much the same. Two plants have been built to make whiting substitute from marl, and both were in operation in 1944. The output of one plant was utilized entirely as a filler for newsprint.

"By-product precipitated chalk, made from waste sludge resulting from the manufacture of caustic soda from soda ash and lime, is classed as a whiting substitute, but its usefulness is restricted by the fact that it almost invariably contains a small amount of free alkali. The raw materials for the manufacture of by-product precipitated chalk are available, but it is not made in Canada.

"Producers of whiting substitute are: Pulverized Products, Limited, Montreal; Claxton Manufacturing Company, Toronto; White Valley Chemicals, Limited, Bobcaygeon, Ontario (operated by Chem-Ore Mines, Limited, Toronto); Marlhill Mines, Limited, Marlbank, Ontario; Gypsum Lime and Alabastine, Canada, Limited, Winnipeg; and Beale Quarries, Limited, Van Anda, Texada Island, British Columbia.

"No separate record is kept of production of whiting substitute, but the industry has experienced a steady growth in recent years because improvements in grinding equipment and the maintenance of close technical control have enabled products to be marketed that are very consistent in chemical and physical properties. Many manufacturers now use the domestic products with entire satisfaction in place of imported whiting, though there are some uses for which chalk whiting is necessary and other materials cannot be substituted.

"There is little or no whiting substitute exported from Canada. Imports of whiting, crude chalk, and prepared chalk were valued at \$334,744 in 1944 compared with \$303,190 in 1943.

"Whiting substitute made in Canada is used mostly in the manufacture of oilcloth, linoleum, in certain kinds of rubber products, in putty, in explosives, and as a filler in newsprint, book, and magazine paper. In lesser quantities it is used in the manufacture of moulded articles, cleaning compounds and polishes, as ceramic glaze, and for a number of other purposes.

"Prices per ton, bagged and in carload lots, range from \$8 to \$15 f.o.b. plants." (Bureau of Mines, Ottawa).

Table 10.—Consumption of Whiting (and Chalk), by Uses, as Reported to the Annual Census of Industry, 1943 and 1944

Industry	1943		1944	
	Tons	Cost at Works	Tons	Cost at Works
Paints and pigments.....	7,773	239,832	8,887	263,998
Rubber.....	3,202	58,215	2,208	46,925
Miscellaneous textiles *	4,147	45,342	4,938	56,713
Explosives (a).....	271	4,472	316	7,489
Toilet preparations (a).....	238	18,985	911	50,540

* Includes oilcloth and linoleum.

(a) Chalk, ground and precipitated.

Table 11.—Imports into Canada and Exports of Stone, by Kinds, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
Imports				
Building stone, n.o.p.....	854	5,651	36,972	15,120
Curling stones and handles therefor.....	392	8,784	396	10,667
Granite, rough, not hammered or chiselled.....		47,291		53,707
Granite, sawn only.....		16,450		15,783
Granite, monuments.....				
Granite, manufactures of, n.o.p.....		5,828		9,430
Marble, rough, not hammered or chiselled.....		5,462		8,844
Marble, sawn or sand rubbed, not polished.....		10,282		22,653
Marble, not further manufactured than sawn for tombstones.....		25,971		38,036
Marble, manufactures of, n.o.p.....		8,915		7,869
Refuse stone.....	807,561	447,850	734,141	398,378
Slate roofing.....	460	5,229	720	7,986
Slate mantels and manufactures of slate, n.o.p.....		37,509		28,075
Chalk, china, cornwall or cliff stone and mica schist.....		33,404		26,107
Mineral wool.....		72,780	1,310	147,862
Whiting, gilders' whiting and Paris white.....	11,198	257,496	13,432	279,112
Manufactures of stone, n.o.p.....		12,290		25,067
Chalk, prepared.....		19,479		19,525
Pumice and pumice stone and lava tufa.....		64,781	578	27,880
Grindstones, not mounted and not less than 36 inches in diameter.no.	1,068	2,266	672	59,211
Grindstones, n.o.p.....	36	452	62	2,098
Burrstones, rough, in blocks.....				1,062
Ganister.....	484	3,970	347	2,463
Total.....		1,110,903		1,206,935
Exports				
Crushed stone.....	1,173	999	597	735
Granite and marble, unwrought.....	3,762	47,258	3,871	42,567
Dressed stone of all kinds.....		7,819		5,713
Grindstones, manufactured.....		5,032		211
Total.....		61,108		49,226

2.—SECONDARY PRODUCTION—THE STONE PRODUCTS INDUSTRY, 1944

In 1944 there were 142 stone dressing works whose operations were reported separately from the quarries. These plants were engaged chiefly in cutting or polishing Canadian or imported stone to produce finished monuments or cut and dressed stone for construction purposes. Retail establishments engaged only in selling and lettering monuments have not been included. Five producers of rock wool were also included in this industry.

Output from this industry was valued at \$4,370,430 in 1944, an increase of 6.6 per cent over the total of \$4,098,100 reported for the previous year. The 59 works in Ontario accounted for

56.6 per cent of the total output and the 39 plants in Quebec for 23.4 per cent. The average number of employees was 854 and \$1,426,262 were paid in salaries and wages. Materials used in the cutting and dressing processes, including stone, cost \$1,670,718 and expenditures for fuel and electricity amounted to \$160,725.

Table 12.—Cost of Materials used in the Stone Products Industry, 1943 and 1944

	Cost at Works	
	1943	1944
	\$	\$
Stone—(a) From Canadian quarries.....	344,413	409,677
(b) Imported.....	178,572	218,367
Monuments, cut and polished, for lettering only.....	87,106	124,383
All other materials.....	911,217	918,291
Total	1,521,308	1,670,718

Table 13.—Production from the Stone Products Industry, by Provinces 1943, and 1944

	Granite		Marble		Marble chips and dust	Limestone		Finished monuments, lettered only	Other products	Total
	Monu-ments	For build-ing purposes	Monu-ments	For build-ing purposes		Monu-ments and bases	For build-ing purposes			
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
Prince Edward Island and New Brunswick—										
1943.....	96,202		20,470					2,310	1,015	119,997
1944.....	108,662		23,612	450				2,275	1,173	136,172
Nova Scotia—										
1943.....	48,510		21,530					31,499	2,148	103,687
1944.....	41,442	4,000	25,000					35,840	2,711	108,993
Quebec—										
1943.....	451,938	23,473	7,656	39,150	5,264	2,425	420	15,770	353,556	899,652
1944.....	557,591	15,471	7,506	26,688	4,679	3,007	650	15,241	389,958	1,020,771
Ontario—										
1943.....	751,272	400	102,773	41,966	1,511	15,221	32,805	75,976	1,406,531	2,428,455
1944.....	795,525	7,073	147,677	35,497	411	33,763	97,459	80,468	1,276,003	2,473,876
Manitoba—										
1943.....	55,788	14,495	18,699	7,360	23,289	2,075	1,402	7,285	1,850	132,743
1944.....	79,045		13,733	5,870	100	2,078		33,785	179	134,790
Saskatchewan—										
1943.....	66,164		44,344		1,654	7,215	1,394	8,375	17,381	146,527
1944.....	92,260	4,650	50,855	3,342	585	7,422	757	9,415	13,782	183,068
Alberta—										
1943.....	65,556	27,500	9,607	5,500	23,000		600		6,592	138,355
1944.....	96,737		21,810		18,040	2,600		41,988	6,926	188,101
British Columbia—										
1943.....	66,326		2,210	2,654				10,950	46,544	128,684
1944.....	99,895	236	445	8,976				9,157	5,950	124,659
Canada—										
1943.....	1,601,756	65,868	227,289	96,630	54,718	27,536	36,021	152,665	1,835,617	4,098,109
1944.....	1,871,157	31,430	280,638	80,503	23,815	48,870	98,866	228,169	1,696,682	4,370,430

Table 14.—Production in Canada and Imports of Rock Wool, 1934-1944

Year	Production	Imports	
	\$	Pounds	\$
1934.....	1,709	2,987,611	69,267
1935.....	66,459	1,922,938	57,877
1936.....	265,472	2,391,504	101,592
1937.....	346,460	2,030,144	81,050
1938.....	396,261	1,337,954	45,109
1939.....	525,998	1,820,763	44,860
1940.....	935,229	2,082,589	52,233
1941.....	1,185,324	2,633,544	74,791
1942.....	1,417,258	1,613,914	54,776
1943.....	1,707,501	1,839,670	72,780
1944.....	1,617,420	2,619,513	147,862

CANADA—DEPARTMENT OF TRADE AND COMMERCE
DOMINION BUREAU OF STATISTICS
MINING, METALLURGICAL AND CHEMICAL STATISTICS

ANNUAL REPORT
ON THE
**MINERAL PRODUCTION OF
CANADA**
DURING THE CALENDAR YEAR
1944

Published by Authority of the Hon. James A. MacKinnon, M.P.,
Minister of Trade and Commerce



OTTAWA
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CONTROLLER OF STATIONERY

1946

PREFACE

Annual reports on the Mineral Production of Canada have been published since 1886. The first reports were prepared by the Geological Survey of Canada, later by the Mines Branch of the Department of Mines, and since 1921 by the Dominion Bureau of Statistics.

The present report contains final data on the production from Canada's metal and non-metal mines and quarries, oil and gas wells, and plants producing lime, products from Canadian clays, and cement. It contains tables showing the salaries and wages paid, the number of employees, the amounts spent on fuel and power, the power-producing equipment installed, and the process supplies purchased.

The report is divided into nine chapters; the first is a complete summary, and the remaining chapters conform to the eight major groups into which the Canadian mining industry is divided. A list of all mining companies which reported to the Bureau for 1944 is added. This list is divided into (a) producing mines, and (b) those which are preparing for production or which are operating but not producing.

The total value of the mineral production of Canada, as shown in this report, includes all metals and minerals with the exception of those obtained from pitchblende ores which are confidential.

In pre-war years, this report included world tables of the production of all important minerals by countries. No figures on world production have been published since 1939, but their publication will be resumed as soon as available.

As in previous years, the Bureau co-operated with the Mines Departments of the provinces of Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan and British Columbia in the collection of these statistics. Forms are filled out in duplicate by the reporting companies, thereby saving the operator extra work, and resulting in uniform totals for Dominion and Provincial statistical bureaux.

The thanks of the Bureau are tendered to the Dominion Department of Mines and Resources and to the mine and smelter operators for assistance given and information made available. Close co-operation has been maintained with the Office of the Metals Controller. Railway and other transportation companies, as well as smelter operators outside of Canada, have also furnished data, the receipt of which is gratefully acknowledged.

The report has been prepared under the direction of Mr. W. H. Losee, B.Sc., Director—Division of Census of Industry and Merchandising, by Mr. R. J. McDowall, B.Sc., Mining Statistician.

HERBERT MARSHALL,
Dominion Statistician.

DOMINION BUREAU OF STATISTICS,
Ottawa, July 30, 1946

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DOMINION BUREAU OF STATISTICS

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ANNUAL REPORT

ON THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1944

CHAPTER ONE

The total gross value of Canadian mineral production during the calendar year 1944 amounted to \$485,819,114, a decrease of 8.3 per cent from the corresponding total of \$530,053,966 recorded for 1943. The combined values of primary metals produced in Canadian metallurgical plants and metals contained in ores exported decreased to \$308,292,161 from a total of \$356,812,760 in the preceding year. The quantity of fuels produced in 1944, including coal, natural gas, peat and petroleum, showed relatively little change from 1943; the total value of these minerals produced during the year under review amounted to \$97,291,007 compared with \$92,514,384 in 1943. The value of asbestos, salt, gypsum and other non-metallic minerals classified as industrial totalled \$37,251,009 in 1944, representing a relatively small decline from \$38,716,568 recorded for the preceding year. Structural materials, comprising clay products, cement, lime, stone and sand and gravel shipped from producing plants in 1944 were evaluated at \$42,984,937 as against \$42,010,254 in 1943.

The decrease in total value of Canadian mineral output in 1944 resulted largely from a pronounced curtailment in the production of most metals; this became evident with the dawn of early victory in Europe and the realization that the war was being definitely won by the allied powers. Following the successful invasion of Normandy on June 6, there commenced a distinct and planned retrenchment in the intensive wartime production of certain metals and minerals considered as strategic during the peak years of uncertainty and stress of conflict.

Stock piles of most of these materials, essential in the mass production of munitions of war, reached satisfactory proportions in 1944. Percentage decreases from 1943 in the quantities of the major base metals produced were copper 4.9; lead 31.4; nickel 4.7 and zinc 9.8. The year under review witnessed the closing down of the Wartime Metals Corporation Chromeraïne Project in the eastern townships of Quebec, and of the Indian Molybdenum mine in Pressiac township of the same province. Tungsten concentrates were shipped from stock piles, but there was no actual production of tungsten ores in Canada during 1944. The purchase of Canadian cobalt ores by the Metal Reserve Company of the United States was discontinued on February 22, 1944. In British Columbia the Takla mercury mine operated by Bralorne Mines Ltd. was closed down in September, and in July the Consolidated Mining and Smelting Company of Canada ceased the production of mercury at Pinchi Lake. In 1944 there was a very considerable decrease in the recovery of the platinum metals from the nickel-copper ores of the Sudbury district. An interesting and important event to be recorded was the first commercial shipment of high-grade hematite iron ore in 1944 from near Atikokan, Ontario, by Steep Rock Iron Mines Ltd.

Canadian gold production in 1944 totalled 2,922,911 fine ounces valued at \$112,532,073 compared with 3,651,301 fine ounces worth \$140,575,088 in 1943. This falling off in gold output was the largest single factor contributing to the decrease in the total value of Canadian mineral production in 1944 and represents the third consecutive year in which annual decreases in gold production have been recorded. The principal reasons for this decline in gold output was a shortage of skilled labour, lack of proper equipment and supplies and more recently and to a lesser extent the recovery of the metal from non-ferrous ores.

Labour shortages were also apparent throughout most of the non-metallic mining industries. Coal mine labour continued to be the determining factor in production and the wastage due to age and mortality was not made up by young men entering the industry; though production decreased, the total value of the output was higher. Coal miners received an additional wage of \$1.00 per day plus paid holidays as from November 1, 1944. In 1944 there was a record amount of exploration and drilling in Alberta and Saskatchewan for new supplies of petroleum and at Norman Wells in the Northwest Territories the Canol pipe line was operated throughout the year. During 1944 two wells were drilled on Cape Breton, Nova Scotia, and one well continued in Prince Edward Island; operations were also continued on a well located in Gaspé, Quebec.

In Ontario, a relatively small tonnage of corundum was shipped from Craigmont, Renfrew county, by Wartime Metals Corporation; this was the first commercial shipment from this area in many years.

Of the grand total gross value of Canadian mineral production in 1944, the mines of Nova Scotia contributed \$33,981,977 (6.99 per cent); New Brunswick \$4,133,902 (0.85 per cent); Quebec \$90,182,553 (18.56 per cent); Ontario \$210,706,307 (43.37 per cent); Manitoba \$13,830,406 (2.85 per cent); Saskatchewan \$22,291,848 (4.59 per cent); Alberta \$51,066,662 (10.51 per cent); British Columbia \$57,246,071 (11.78 per cent); Northwest Territories \$1,440,069 (0.31 per cent) and Yukon \$939,319 (0.19 per cent).

Employees in the entire Canadian mining industry totalled 104,878 in 1944 and salaries and wages distributed amounted to \$204,808,314 compared with 112,140 employees and \$207,575,955 in 1943, and 112,043 employees and \$198,550,260 in 1942.

Table 1.—Quantities and Values of Mineral Products from Canadian Sources, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
METALLICS				
Antimony.....lb.	1,114,166	189,408	1,937,933	281,000
Arsenic (As ₂ O ₃).....lb.	3,153,538	254,009	2,627,022	180,866
Bismuth.....lb.	407,597	562,484	123,875	154,844
Cadmium.....lb.	786,611	904,602	526,970	579,667
Chromite.....ton	29,595	919,878	27,054	748,494
Cobalt.....lb.	175,961	191,407	36,283	34,106
Copper.....lb.	575,190,132	67,170,601	547,070,118	65,257,172
Gold.....fine oz.	3,651,301	140,575,088	2,922,911	112,532,073
Iron ore.....ton	641,294	2,032,240	553,252	1,909,608
Lead.....lb.	444,060,769	16,670,041	304,582,198	13,706,199
Magnesium.....lb.	7,153,974	2,074,652	10,579,778	2,575,695
Manganese ore.....ton	48	985		
Mercury.....lb.	1,690,240	4,559,200	735,908	1,210,375
Molybdenite concentrates.....lb.	784,715	549,515	2,127,508	1,079,698
Nickel.....lb.	288,018,615	71,675,322	274,598,629	69,204,152
Palladium, rhodium, iridium, etc.....fine oz.	126,004	5,233,068	42,929	1,960,085
Platinum.....fine oz.	219,713	8,458,951	157,523	6,064,635
Pitchblende products.....(a)				(a)
Selenium.....lb.	374,013	654,523	298,592	537,466
Silver.....fine oz.	17,344,569	7,849,111	13,627,109	5,859,656
Tellurium.....lb.	8,600	15,050	10,661	18,657
Thallium.....lb.				1,690
Tin.....lb.	776,937	450,623	516,626	299,643
Titanium ore.....ton	69,437	308,290	33,973	165,195
Tungsten concentrates.....lb.	1,508,621	1,083,538	886,745	245,780
Zinc.....lb.	610,754,354	24,430,174	550,823,353	23,685,405
Total Metallics.....		356,812,760		308,292,161

Table 1.—Quantities and Values of Mineral Products from Canadian Sources, 1943 and 1944—Concluded

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
NON-METALLICS—FUELS				
Coal.....ton	17,859,057	62,877,549	17,026,499	70,433,169
Natural gas.....M cu. ft.	44,276,216	13,159,418	45,067,158	11,422,541
Peat.....ton	782	7,000	644	5,397
Petroleum.....bbl.	10,052,302	16,470,417	10,099,404	15,429,900
Total.....		92,514,384		97,291,007
OTHER NON-METALLICS				
Asbestos.....ton	467,196	23,169,505	419,265	20,619,516
Barite.....ton	24,474	279,253	118,719	1,023,696
Corundum.....ton			173	17,111
Diatomite.....ton	98	3,331	13	437
Feldspar.....ton	23,858	237,771	23,509	227,632
Fluorspar.....ton	11,210	318,424	6,924	217,701
Garnet rock.....ton			3	90
Graphite.....ton	1,903	197,431	1,582	171,166
Grindstones.....ton	164	6,225	225	12,000
Gypsum.....ton	446,848	1,381,468	596,164	1,511,978
Iron oxides.....ton	8,401	135,893	8,599	150,250
Magnetitic dolomite and brucite.....ton		1,260,056		1,139,281
Mica.....lb.	8,050,692	553,856	6,684,846	841,026
Mineral waters.....gal.	139,611	67,541	156,150	79,031
Nepheline syenite.....ton	49,901	292,010	47,625	217,989
Peat moss.....ton	64,360	1,461,422	(b) 80,446	1,869,553
Phosphate.....ton	1,451	18,385	482	6,716
Quartz.....ton	1,776,749	1,608,448	1,740,262	1,658,409
Salt.....ton	687,686	4,379,378	695,217	4,074,021
Silica brick.....M	4,165	295,505	3,997	312,092
Soapstone (including some talc).....ton	14,204	135,469	19,013	204,127
Sodium carbonate.....ton	468	5,148	44	484
Sodium sulphate.....ton	107,121	1,025,151	102,421	987,842
Sulphur.....ton	257,515	1,753,425	248,088	1,755,739
Talc.....ton	11,959	131,216	13,584	153,122
Volcanic dust.....ton	50	257		
Total.....		38,716,568		37,251,009
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS				
Clay products (brick, tile, etc.).....bbl.		6,608,193		6,997,425
Cement.....bbl.	7,302,289	11,599,033	7,190,851	11,621,372
Lime.....ton	907,768	6,832,992	885,142	6,926,844
Sand and gravel.....ton	25,744,469	9,005,857	28,399,986	10,280,119
Stone.....ton	7,222,950	7,964,179	5,994,992	7,159,177
Total.....		42,010,254		42,984,937
Grand Total.....		530,053,966		485,819,114

(a) Not available for publication.

(b) Includes some duplication resulting from the resale of moss purchased from other producers.

[illegible]

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1944—Continued

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
OTHER NON-METALLIC AND INDUSTRIAL MINERALS —Concluded											
Phosphate.....	ton		482								482
Quartz.....	\$		6,716								6,716
Quartz.....	ton	10,100	236,091	(x) 1,325,288		(x) 143,101		24,682			1,746,262
Salt.....	\$	27,350	639,429	888,389		50,085		73,156			1,638,409
Salt.....	ton	38,809		603,806	27,267		25,335				693,217
Silica brick.....	\$	281,482		2,906,117	488,776		387,646				4,074,921
Silica brick.....	M	2,631		1,066							3,397
Soapstone (including some talc).....	\$	177,003	19,013	135,089							312,692
Soapstone (including some talc).....	ton		204,127								19,013
Sodium carbonate.....	\$										204,127
Sodium carbonate.....	ton										484
Sodium sulphate.....	\$					102,421					102,421
Sodium sulphate.....	ton					987,842					987,842
Sulphur.....	\$		116,887	17,876				113,325			230,688
Sulphur.....	ton		433,501	178,760				1,123,478			1,755,524
Talc.....	\$			13,584							13,584
Talc.....	ton			153,122							153,122
Total	\$	1,946,716	23,999,410	6,056,468	899,152	1,037,927	397,646	2,636,942			37,251,009
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS											
CLAY PRODUCTS											
Clay—Bentonite.....	\$										163,848
Clay—Bentonite.....	ton	2,919			160,268	948	2,076	1,504			7,630
Fireclay.....	\$	10,711				9,133		3,763			38,433
Fireclay.....	ton							18,589			5,758
Kaolin.....	\$		424								18,801
Kaolin.....	ton		5,758			18,315					92,602
Other clay.....	\$			486		90,817					221,251
Other clay.....	ton			1,785		194,824		26,157			3,177
Fireclay blocks and shapes.....	\$										164,637
Fireclay blocks and shapes.....	M	270						164,637			7,917
Firebrick.....	\$	3									177,659
Firebrick.....	M	147						10,921			14,182
Brick, soft mud process—Face.....	\$			7,489							214,336
Brick, soft mud process—Face.....	M			166,738				1,738			55,175
Brick, soft mud process—Face.....	ton	1,703	1,350	3,862	516	180	4,827	35,564			1,360,083
Common.....	\$	29,267	18,836	67,166	8,115	2,060	53,232				743,437
Common.....	M	1,411	21,724	29,930	800	138	880				
Stiff mud process—Face.....	\$			743,375	24,000	4,179	17,407	10,410			
Stiff mud process—Face.....	M	42,337	518,375	2,999	250	214	683	22			
(wire cut) Common.....	\$	5,981	31,009	2,999	5,000	2,853	12,685	325			
(wire cut) Common.....	M	96,315	538,624	48,256							

Dry press—Face..	M	2,241	8,152	4	3,100	463	13,990
Common	M	63,947	204,747	138	48,719	20,164	337,715
Fancy or ornamental brick (including special shapes, embossed and enamelled brick)	M	8,779	3,030		6,100		18,809
Sewer brick	M	163,884	88,112		65,897		317,893
Paving brick	M		28				28
Structural tile—Hollow blocks (including fireproofing and load-bearing tile)	ton	13,139	1,668	2,829	8,157	2,395	87,890
Roofing tile	ton	119,595	14,071	23,503	72,556	26,527	811,558
Drain tile	M	158	43,817	85	251	1,733	43,817
Sewer pipe (including copings, flue linings, etc.)	M	5,733	618	3,400	10,434	66,999	13,654
Pottery, glazed or unglazed (including coarse earthenware, stoneware, flower pots and all other pottery)	ton	159,373	28,005		243,245	68,340	425,725
Other products	ton	10,454	312,081				964,732
	ton		60,000		617,326	3,930	638,544
	ton		6,047		32,506		52,147
Total Clay Products	\$	402,694	2,347,396	330,397	1,143,577	486,626	6,997,435
OTHER STRUCTURAL MATERIALS							
Cement	bbl.		1,863,210		699,989		7,190,831
Lime (s)—Quicklime	ton	3,362	2,730,381		1,370,502	512,504	11,631,372
Hydrated lime	ton	42,957	391,678		18,102	36,798	738,202
	ton		2,167,913		151,457	324,553	5,918,079
	ton		2,580		8,071		146,910
	ton		32,102		7,500		978,765
Total lime	ton	3,362	423,285		18,852	44,869	885,142
Sand and gravel	ton	42,957	3,311,177		158,957	380,896	6,976,844
Stone—Granite	ton	911,970	9,529,303		833,524	4,357,362	28,399,986
Limestone (s)	ton	411,041	4,417,427		1,194,856	12,716	10,280,119
Marble	ton	37,532	127,544		328,151	76,052	269,964
Sandstone	ton	50,734	830,238		12,726	181,141	1,303,740
Slate	ton	123,613	2,370,141		43,049	249,373	5,565,286
	ton		2,349,177		126	5,598,459	
	ton		6,488		2,155	11,829	
	ton		50,569		85,374		
	ton		89,470		4,860	146,766	
	ton		5,223		3,000	223,453	
	ton		104,629		949	1,147	
	ton		198		17,903		18,101
Total stone	ton	98,433	2,983,283		12,726	199,701	5,994,932
	ton	225,113	2,909,980		43,049	348,483	7,159,177
Total Other Structural Materials	\$	679,111	13,368,965	533,175	1,900,659	3,010,156	35,987,512
Total Clay Products and other Structural Materials	\$	1,081,805	15,716,361	864,082	3,044,236	3,496,782	42,984,937
Grand Total	\$	33,981,977	210,706,307	22,231,848	51,066,662	57,246,071	485,819,114
							939,319
							1,440,063

Table 2.—Finally Revised Statistics on the Mineral Production of Canada, by Provinces, 1944—Concluded

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	Northwest Territories	Yukon	Canada
Metallics.....\$	224,921	.....	51,532,006	183,941,161	10,384,532	18,308,299	1,955	42,102,841	807,147	939,319	308,292,161
Fuels.....\$	30,728,535	2,219,745	3,597	4,992,317	.....	2,081,570	47,622,815	9,009,506	632,922	.....	97,231,007
Other non-metallies.....\$	1,946,716	275,748	23,999,410	6,056,468	899,152	1,037,927	397,646	2,636,942	.....	.....	37,231,009
Clay products.....\$	402,694	207,031	1,881,791	2,347,396	197,383	330,907	1,143,577	486,626	.....	.....	6,397,445
Other structural materials.....\$	679,111	1,430,358	12,715,749	13,368,965	2,349,339	533,175	1,900,659	3,010,156	.....	.....	33,987,312
Grand Total—1944.....\$	33,981,977	4,133,902	90,182,553	210,706,307	13,830,406	22,291,848	51,066,662	57,246,071	1,440,069	939,319	485,819,114
Per cent of total.....	6.99	0.85	18.56	43.37	2.85	4.59	10.51	11.78	0.31	0.19	100.00
Grand Total—1943.....\$	29,979,837	3,676,894	101,610,678	232,948,959	13,412,266	26,735,984	48,941,210	68,442,386	2,679,993	1,625,819	550,053,966
Grand Total—1942.....\$	32,783,165	3,609,138	104,300,010	259,114,946	14,345,046	20,578,719	47,359,831	77,247,932	3,976,267	3,453,568	566,768,672
Grand Total—1941.....\$	32,569,887	3,690,375	99,651,044	267,435,727	16,089,867	15,020,555	41,364,385	76,841,180	3,860,298	3,117,992	560,241,290

(a) Data not available.
(b) Includes cobalt in crude ores exported; cobalt in ores shipped from Government stock pile, and any cobalt recovered from Canadian ores at the Deloro smelter.
(x) Includes relatively large quantities used as a chemical.

Table 3.—Production of Leading Mineral Products, by Months, 1943 and 1944

1943	Asbestos	Cement	Clay Products	Coal	Copper
	tons	barrels	\$	tons	pounds
January.....	32,541	294,518	367,605	1,559,304	45,916,074
February.....	36,161	278,128	389,235	1,578,404	47,372,427
March.....	40,275	437,903	430,216	1,688,463	52,897,339
April.....	33,358	460,174	468,325	1,387,020	52,915,538
May.....	48,867	706,464	544,910	1,318,099	49,601,198
June.....	43,487	827,085	620,376	1,365,993	46,263,193
July.....	43,767	936,684	655,550	1,387,654	47,354,190
August.....	40,059	953,742	684,649	1,441,577	46,222,900
September.....	39,252	878,453	709,227	1,463,498	42,540,896
October.....	33,911	813,867	681,642	1,569,411	48,860,883
November.....	38,989	497,577	623,167	1,472,424	47,505,267
December.....	36,529	217,664	433,291	1,627,210	47,740,227
Total.....	467,196	7,302,289	6,608,193	17,859,057	575,190,132

1943	Feldspar	Gold	Gypsum	Lead	Lime
	tons	fine oz.	tons	pounds	tons
January.....	1,209	334,422	28,131	38,604,106	67,255
February.....	1,448	327,318	24,110	38,807,636	68,827
March.....	1,780	347,591	35,429	46,936,027	79,712
April.....	1,307	323,041	25,063	36,773,575	82,173
May.....	1,441	313,489	22,832	40,601,268	73,504
June.....	3,123	326,839	23,314	39,579,471	66,755
July.....	1,959	292,663	36,759	36,100,126	71,781
August.....	2,772	293,281	50,623	32,113,307	76,655
September.....	2,548	282,130	51,825	32,884,233	80,181
October.....	2,093	279,988	61,143	35,272,574	80,862
November.....	2,079	267,726	46,666	34,635,657	85,868
December.....	2,099	262,813	40,946	31,752,789	72,087
Total.....	23,858	3,651,301	446,848	444,060,769	905,660

1943	Natural Gas	Nickel	Petroleum	Salt (x)	Silver	Zinc
	M cu. ft.	pounds	barrels	tons	fine oz.	pounds
January.....	5,511,483	25,338,479	856,361	23,871	1,620,707	52,578,751
February.....	4,518,318	23,156,794	775,985	23,778	1,637,526	48,105,936
March.....	5,052,566	26,106,700	856,649	24,690	1,787,355	54,101,689
April.....	3,083,571	25,612,003	832,765	26,249	1,688,247	50,706,472
May.....	3,135,347	24,517,190	835,321	29,748	1,475,903	53,667,946
June.....	2,529,662	25,739,223	821,869	30,569	1,392,477	53,335,891
July.....	2,307,864	23,585,993	843,127	32,839	1,348,784	52,585,837
August.....	2,328,297	21,334,008	533,631	30,513	1,298,765	52,053,564
September.....	2,729,297	22,524,474	823,054	31,007	1,172,710	48,129,596
October.....	3,423,322	22,924,363	855,009	30,419	1,291,502	46,836,744
November.....	4,180,824	23,175,838	829,559	31,180	1,367,624	46,989,693
December.....	4,875,725	24,003,550	836,072	26,678	1,262,939	51,662,235
Total.....	44,276,216	288,018,615	10,052,302	341,541	17,344,569	610,754,354

1944	Asbestos	Cement	Clay Products	Coal	Copper
	tons	barrels	\$	tons	pounds
January.....	31,987	176,123	375,256	1,626,068	48,877,850
February.....	32,663	201,622	333,525	1,454,614	45,836,837
March.....	36,675	272,971	393,411	1,546,446	48,203,812
April.....	33,839	393,811	411,640	1,236,200	44,989,445
May.....	35,644	738,885	621,655	1,290,481	47,578,287
June.....	35,495	994,410	681,358	1,233,251	47,082,930
July.....	31,259	982,191	740,908	1,168,859	44,975,986
August.....	37,036	943,459	759,123	1,379,044	44,743,580
September.....	38,137	860,024	745,672	1,391,475	43,106,124
October.....	37,752	878,238	766,808	1,528,291	42,039,927
November.....	36,076	559,448	721,703	1,638,628	43,811,150
December.....	32,702	189,969	446,366	1,533,142	45,824,190
Total.....	419,265	7,190,851	6,997,425	17,026,499	547,070,118

(x) Commercial salt only.

Table 3.—Production of Leading Mineral Products, by Months, 1943 and 1944
—Concluded

1944	Feldspar	Gold	Gypsum	Lead	Lime
	tons	fine oz.	tons	pounds	tons
January.....	1,580	258,607	44,157	32,887,666	74,063
February.....	2,766	257,613	44,704	29,887,544	75,295
March.....	2,316	267,485	49,168	24,373,016	78,485
April.....	1,279	245,577	38,839	25,882,726	74,638
May.....	1,131	257,647	41,547	20,583,341	76,432
June.....	2,259	240,673	47,177	19,832,745	73,869
July.....	1,806	236,362	66,660	24,633,240	67,957
August.....	1,832	237,617	80,437	18,401,675	70,837
September.....	2,177	237,151	57,804	18,993,630	71,269
October.....	2,355	230,749	50,047	18,452,002	79,981
November.....	1,849	223,806	39,965	35,836,191	75,336
December.....	2,159	229,624	35,659	35,347,422	66,980
Total.....	23,599	2,922,911	596,164	394,582,198	885,142

1944	Natural Gas	Nickel	Petroleum	Salt (x)	Silver	Zinc
	M cu. ft.	pounds	barrels	tons	fine oz.	pounds
January.....	5,155,411	23,546,809	831,512	25,163	1,212,349	49,438,642
February.....	5,052,082	22,383,335	788,257	23,761	1,280,962	46,551,662
March.....	4,981,513	25,290,263	871,446	27,701	1,375,351	47,918,693
April.....	4,043,182	23,161,864	898,010	26,853	1,237,170	45,119,487
May.....	3,104,618	24,024,759	852,335	31,004	1,035,847	47,499,582
June.....	2,677,868	20,374,755	818,678	27,801	1,167,200	41,373,262
July.....	2,424,789	23,411,947	806,342	27,693	1,077,974	42,536,604
August.....	2,393,762	23,848,093	827,603	27,690	835,166	44,843,903
September.....	2,634,712	22,710,286	852,263	29,290	910,538	46,955,939
October.....	3,053,695	21,819,119	878,082	24,691	1,060,764	43,095,175
November.....	4,398,092	22,259,195	855,752	30,401	1,199,153	44,718,272
December.....	5,147,434	21,768,204	879,124	22,970	1,234,315	50,769,132
Total.....	45,067,158	274,598,629	10,099,404	325,018	13,627,109	550,329,353

(x) Commercial salt only.

Table 4.—Summary, by Nine Main Branches, of the Net Value of Commodity Production in Canada, 1939-1943*

	1939	1940	1941	1942	1943
	\$	\$	\$	\$	\$
Agriculture.....	(*) 722,263,000	774,023,000	803,185,000	1,951,906,000	1,245,845,000
Forestry.....	271,723,416	370,121,275	421,419,139	429,978,294	261,816,227
Fisheries.....	34,378,681	38,106,690	51,769,638	64,821,702	74,655,678
Trapping.....	7,919,412	11,207,980	15,188,040	23,801,213	21,579,615
Mining (Total).....	393,232,044	448,089,729	497,904,632	514,109,951	475,529,364
Auriferous quartz.....	129,633,245	146,713,744	145,978,893	181,888,002	86,597,719
Other mining.....	263,598,799	301,366,985	351,925,739	332,171,889	379,931,654
Electric power.....	149,863,892	163,780,757	133,146,426	200,345,240	200,633,297
Construction.....	153,706,338	206,893,962	269,561,885	310,917,190	293,538,167
Custom and repair.....	108,821,000	111,608,000	130,778,000	141,395,000	144,952,000
Manufactures, n.e.s. (*).....	1,277,265,130	1,591,625,600	2,194,821,275	2,884,591,957	3,495,711,926
Grand Total.....	3,149,172,913	3,715,447,978	4,567,724,033	5,920,576,613	6,325,458,273
Manufactures, Total.....	1,531,051,991	1,942,471,235	2,605,119,788	3,309,973,758	3,816,413,541

* Business Statistics Branch, Dominion Bureau of Statistics (1943 Survey of Production Report).

† The difference between "Manufactures, Total" and "Manufactures, n.e.s." is the amount of the duplication between primary and secondary industries. The sum of "Manufactures, n.e.s." and the eight other main branches is regarded as the grand total.

Table 5.—Provincial Distribution of the Net Value of Commodity Production in Canada, 1939-1943

Province	1939	1940	1941	1942	1943
	\$	\$	\$	\$	\$
Prince Edward Island.....	10,095,108	11,246,797	11,902,619	15,369,746	19,955,547
Nova Scotia.....	103,580,011	125,850,203	133,581,788	161,603,076	187,595,481
New Brunswick.....	71,771,425	85,076,573	102,048,957	116,820,880	133,799,469
Quebec.....	826,352,765	991,849,049	1,278,326,692	1,610,227,431	1,848,391,341
Ontario.....	1,324,654,503	1,588,120,149	2,049,178,610	2,440,514,058	2,622,176,339
Manitoba.....	145,272,803	170,695,828	195,328,675	268,265,285	285,852,815
Saskatchewan.....	218,239,483	215,014,542	183,233,045	426,555,113	333,445,471
Alberta.....	199,701,118	233,532,134	231,709,186	385,214,709	321,341,525
British Columbia.....	242,364,518	287,653,018	374,168,179	486,376,020	565,082,092
Yukon and Northwest Territories.....	7,141,179	6,409,680	8,246,282	9,630,295	7,818,293
Canada.....	3,149,172,913	3,715,447,973	4,567,724,033	5,920,576,613	6,325,458,373

Table 6.—Proportion Contributed by Mining to Total Net Value of Production in each Province, 1939-1943

Province	1939	1940	1941	1942	1943	
	Mining Net	Mining Net	Mining Net	Mining Net	Mining Net	Percentage of Net Value Provincial Production
	\$	\$	\$	\$	\$	All Mines % Auriferous quartz mines only %
Prince Edward Island.....						
Nova Scotia.....	23,504,419	26,189,233	24,535,707	25,174,960	21,979,202	11.72
New Brunswick.....	3,600,454	3,024,317	3,231,658	3,176,007	3,249,933	2.43
Quebec.....	81,600,118	100,134,979	127,649,905	138,100,940	134,500,359	7.28
Ontario.....	188,867,969	209,277,055	219,459,886	212,351,819	183,488,086	7.00
Manitoba.....	12,401,404	14,065,270	11,808,109	9,508,569	8,973,959	3.14
Saskatchewan.....	6,391,404	8,652,006	9,336,756	14,487,408	23,507,079	7.05
Alberta.....	26,049,861	29,593,293	36,167,469	40,604,704	41,767,222	13.00
British Columbia.....	45,419,651	52,513,427	60,323,299	64,378,171	54,105,996	9.57
Yukon and Northwest Territories.....	5,396,764	4,631,149	5,301,743	6,327,373	3,957,528	50.62
Canada.....	393,232,044	448,080,729	497,904,632	514,109,951	475,529,364	7.52

Table 7.—Annual Values of the Mineral Production of Canada since 1886

NOTE.—In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals, copper, gold, lead, nickel, silver, zinc, etc., is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued chiefly at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	\$	\$		\$	\$
1886.....	10,221,255	2.23	1916.....	177,201,534	22.05
1887.....	10,321,331	2.23	1917.....	189,646,821	23.18
1888.....	12,518,894	2.67	1918.....	211,301,897	25.37
1889.....	14,013,113	2.96	1919.....	176,686,390	20.84
1890.....	16,763,353	3.50	1920.....	227,859,665	26.40
1891.....	18,976,616	3.92	1921.....	171,923,342	19.56
1892.....	16,623,415	3.39	1922.....	184,297,242	20.55
1893.....	20,035,082	4.04	1923.....	214,079,331	23.41
1894.....	19,931,158	3.98	1924.....	209,583,406	22.71
1895.....	20,505,917	4.05	1925.....	226,563,333	24.19
1896.....	22,474,256	4.38	1926.....	240,437,123	25.61
1897.....	28,485,023	5.49	1927.....	247,356,695	25.67
1898.....	38,412,431	7.32	1928.....	274,989,487	27.96
1899.....	49,234,005	9.27	1929.....	310,850,246	31.00
1900.....	64,420,877	12.04	1930.....	279,873,578	27.42
1901.....	65,797,911	12.16	1931.....	230,434,726	22.21
1902.....	63,231,836	11.36	1932.....	191,228,225	18.20
1903.....	61,740,513	10.83	1933.....	221,495,253	20.74
1904.....	60,082,771	10.27	1934.....	278,161,590	25.67
1905.....	69,078,999	11.49	1935.....	312,344,457	28.56
1906.....	79,286,697	12.81	1936.....	361,919,372	32.82
1907.....	86,865,202	13.75	1937.....	457,359,082	41.13
1908.....	85,557,101	13.16	1938.....	441,823,237	39.42
1909.....	91,831,441	13.70	1939.....	474,602,059	41.94
1910.....	106,823,623	14.93	1940.....	529,825,035	46.39
1911.....	103,220,994	14.32	1941.....	560,241,290	49.06
1912.....	135,048,296	18.33	1942.....	566,768,672	48.63
1913.....	145,634,812	19.35	1943.....	530,053,966	44.87
1914.....	128,863,075	16.75	1944.....	485,819,114	*40.57
1915.....	137,109,171	17.44			
Grand Total.....				10,767,855,346	

*Based on an estimated population of 11,975,000 in 1944.

NOTE.—For complete data, by minerals, see Annual Mineral Production Report for 1942.

Table 8.—Annual Values of the Mineral Production of Canada, by Classes, since 1929

Year	Metallics	Non-metallics		Total
		Fuels and other non-metallics	Structural materials and clay products	
	\$	\$	\$	\$
1929.....	154,454,056	97,861,356	58,534,834	310,850,246
1930.....	142,743,764	83,402,349	53,727,465	279,873,578
1931.....	120,930,147	65,346,284	44,158,295	230,434,726
1932.....	112,041,763	56,788,179	22,398,283	191,228,225
1933.....	147,015,593	57,782,973	16,696,687	221,495,253
1934.....	194,110,968	64,763,861	19,286,761	278,161,590
1935.....	221,800,849	67,328,208	23,215,400	312,344,457
1936.....	259,425,194	76,723,437	25,770,741	361,919,372
1937.....	334,165,243	88,324,150	34,869,699	457,359,092
1938.....	323,075,154	84,869,417	33,878,666	441,823,237
1939.....	343,506,123	95,733,177	35,362,759	474,602,059
1940.....	382,503,012	104,849,372	42,472,651	529,825,035
1941.....	395,346,581	119,521,437	45,373,272	560,241,290
1942.....	*392,192,452	128,846,413	45,729,807	566,768,672
1943.....	*356,812,760	131,230,952	42,010,254	530,053,966
1944.....	*308,292,161	134,542,016	42,984,937	485,819,114

*Exclusive of the values of pitchblende products.

NOTE.—For a history of Canadian Mining see the 1942 Annual Mineral Production Report for Canada.

Table 9.—Total (Cumulative) Recorded Production in Canada of Specified Metals and Minerals to December 31, 1944

		Quantity	Value
			\$
Gold.....	(a) fine ounces	92,297,754	2,684,387,981
Silver.....	(b) fine ounces	880,919,928	494,565,826
Copper.....	(c) pounds	9,722,381,043	1,137,180,949
Nickel.....	(d) pounds	4,182,022,892	1,136,791,884
Lead.....	(b) pounds	8,566,923,587	368,433,325
Zinc.....	(f) .....	.....	280,533,781
Cobalt.....	(e) pounds	34,417,386	33,726,917
Platinum metals.....	(g) fine ounces	3,357,717	.....
Coal.....	(h) tons	686,348,556	2,101,717,301
Asbestos.....	(i) tons	9,078,939	358,558,518

NOTE.—The total value of production by the entire Canadian mining industry from 1886 to the end of 1944 totalled \$10,767,855,346.

(a) Since 1858; (b) since 1887; (c) since 1886; (d) since 1889; (e) since 1904; (f) since 1898; (g) since 1920. Production data prior to 1920 were not included owing to some doubt existing as to origin of certain metals recovered in United States plants. (h) since 1785; (i) since 1880.

Table 10.—Values of the entire Mineral Production of Canada, by Provinces, since 1932

Year	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba
	\$	\$	\$	\$	\$
1932.....	16,201,279	2,223,505	25,638,466	85,910,030	9,058,365
1933.....	16,966,183	2,107,682	28,141,482	110,205,021	9,026,951
1934.....	23,310,729	2,156,151	31,269,945	145,565,871	9,776,934
1935.....	23,183,128	2,821,027	39,124,696	158,934,269	12,052,417
1936.....	26,672,278	2,587,791	49,736,919	184,532,892	11,315,527
1937.....	30,314,188	2,763,643	65,160,215	230,042,517	15,751,645
1938.....	26,253,645	3,802,565	68,965,594	219,801,994	17,173,002
1939.....	30,746,200	3,949,433	77,335,998	232,519,948	17,137,950
1940.....	33,318,587	3,435,916	86,313,491	261,483,349	17,828,522
1941.....	32,569,867	3,690,375	99,651,044	267,435,727	16,089,867
1942.....	32,783,165	3,690,158	104,300,010	259,114,946	14,345,046
1943.....	29,979,837	3,676,834	101,610,678	232,948,959	13,412,266
1944.....	33,981,977	4,133,902	90,182,553	210,706,307	13,830,406

Year	Saskatchewan	Alberta	British Columbia	Yukon	Northwest Territories (*)
	\$	\$	\$	\$	\$
1932.....	1,681,728	21,174,061	27,326,173	1,993,195	21,423
1933.....	2,477,425	19,702,953	30,794,504	2,041,223	279,729
1934.....	2,977,061	20,228,851	41,206,965	1,628,879	199,604
1935.....	3,816,943	22,289,681	48,692,050	1,302,308	541,638
1936.....	6,970,397	23,305,726	54,407,036	2,220,372	775,834
1937.....	10,271,463	25,597,117	73,555,798	3,784,528	994,518
1938.....	7,782,647	28,966,272	64,549,130	3,959,570	1,614,076
1939.....	8,794,090	30,691,617	65,216,745	4,961,321	3,248,777
1940.....	11,505,858	35,062,337	74,134,485	4,118,333	2,594,157
1941.....	15,020,555	41,364,385	76,841,180	3,117,992	3,860,298
1942.....	20,578,749	47,359,831	77,247,932	3,453,568	3,976,267
1943.....	26,735,984	48,941,210	68,442,386	1,625,819	2,679,993
1944.....	22,291,848	51,066,662	57,246,071	939,319	1,440,069

* Values of pitchblende products not included in 1942, 1943 or 1944.

Table 11.—Average Annual Metal Prices, in Canadian Dollars, 1929-1944

Year	Gold	Silver	Copper	Lead	Zinc
	Troy oz.	Troy oz.	Pound	Pound†	Pound†
	\$	\$	\$	\$	\$
1929.....	20.67	0.530	0.180*	0.050	0.054
1930.....	20.67	0.381	0.130*	0.039	0.036
1931.....	21.55	0.298	0.0837*	0.027	0.025
1932.....	23.47	0.317	0.0638	0.021	0.024
1933.....	28.60	0.378	0.0745	0.024	0.032
1934.....	34.50	0.475	0.0742	0.024	0.030
1935.....	35.19	0.648	0.0780	0.031	0.031
1936.....	35.03	0.451	0.0948	0.039	0.033
1937.....	34.99	0.449	0.131	0.051	0.0490
1938.....	35.17	0.435	0.0997	0.034	0.031
1939.....	36.14	0.405	0.101†	0.032	0.031
1940.....	38.50	0.382	0.101	0.034	0.034
1941.....	38.50	0.3826	0.101	0.034	0.034
1942.....	38.50	0.4216	0.101	0.034	0.034
1943.....	38.50	0.4525	0.1175	0.375	0.040
1944.....	38.50	0.430	0.120	0.450	0.040

*Based on New York; 1932-1942 based on London.

† Based on London; prices controlled by Government since 1939 and subject to revision since 1939.

YEARLY AVERAGE PRICES OF COPPER, LEAD, ZINC AND SILVER

Table 12.—(Copper, lead and zinc in U.S. cents per pound; silver, U.S. cents per ounce)
(American Bureau of Metal Statistics)

Year	Copper New York (b)	Lead New York	Zinc (a)	Silver New York	Year	Copper New York (b)	Lead New York	Zinc (a)	Silver New York
	Yearly average	Yearly average	Yearly average	Yearly average		Yearly average	Yearly average	Yearly average	Yearly average (c)
1889.....	13-750	3-930	5-023	93-600	1917.....	27-180	8-787	8-730	81-417
1890.....	15-750	4-480	5-550	104-600	1918.....	24-628	7-413	7-890	96-772
1891.....	12-625	4-350	5-020	98-800	1919.....	18-691	5-759	6-988	111-122
1892.....	11-550	4-090	4-630	87-600	1920.....	17-456	7-957	7-671	100-900
1893.....	10-750	3-730	4-080	78-200	1921.....	12-502	4-545	4-655	62-654
1894.....	9-560	3-290	3-520	63-000	1922.....	13-382	5-734	5-716	67-528
1895.....	10-760	3-230	3-630	65-280	1923.....	14-421	7-267	6-607	64-873
1896.....	10-850	2-980	3-940	67-060	1924.....	13-024	8-097	6-344	66-781
1897.....	11-290	3-580	4-120	59-790	1925.....	14-042	9-020	7-622	69-065
1898.....	12-030	3-780	4-570	58-260	1926.....	13-795	8-417	7-337	62-107
1899.....	16-670	4-470	5-750	59-580	1927.....	12-920	6-755	6-242	56-370
1900.....	16-190	4-370	4-390	61-330	1928.....	14-570	6-305	6-027	58-176
1901.....	16-110	4-330	4-070	58-950	1929.....	18-107	6-833	6-512	62-993
1902.....	11-626	4-069	4-840	52-160	1930.....	12-982	5-517	4-556	38-154
1903.....	13-235	4-237	5-191	53-570	1931.....	8-116	4-243	3-640	28-700
1904.....	12-823	4-309	4-931	57-221	1932.....	5-555	3-180	2-876	27-892
1905.....	15-590	4-707	5-730	60-352	1933.....	7-025	3-869	4-029	34-727
1906.....	19-278	5-657	6-048	66-791	1934.....	8-428	3-860	4-158	47-973
1907.....	20-004	5-825	5-812	65-327	1935.....	8-649	4-065	4-328	64-273
1908.....	13-208	4-200	4-578	52-864	1936.....	9-474	4-710	4-901	45-087
1909.....	12-982	4-273	5-352	51-502	1937.....	13-167	6-009	6-519	44-883
1910.....	12-738	4-446	5-370	53-486	1938.....	10-000	4-739	4-610	43-225
1911.....	12,376	4-420	5-608	53-304	1939.....	10-965	5-053	5-110	39-082
1912.....	16-341	4-471	6-799	60-835	1940.....	11-296	5-179	6-335	34-773
1913.....	15-269	4-370	5-504	59-791	1941.....	11-797	5-793	7-474	34-783
1914.....	13-602	3-862	5-061	54-811	1942.....	11-775	6-481	8-250	38-333
1915.....	17-275	4-673	13-054	49-684	1943.....	11-775	6-500	8-250	44-750
1916.....	27-202	6-858	12-634	65-661	1944.....	11-775	6-500	8-250	44-750

(a) To 1902, price of zinc at New York; for later years, price of zinc at East St. Louis.

(b) To 1898, price of Lake Copper. (c) 1932-1944—for other than newly mined domestic.

STATEMENT OF MINISTER OF FINANCE IN 1944 BUDGET SPEECH
RESPECTING MINING TAXATION

In his 1944 Budget Speech, delivered in the House of Commons on June 26, the Minister of Finance, Hon. J. L. Ilsley, made the following statement in respect of mining taxation:

"During recent months we have been urged to introduce a number of drastic changes in the tax structure as it affects the mining and oil producing industries. These industries are very properly considering their post-war position and the contribution which they can make to the solution of post-war problems. Needless to say, the government has very much in mind the need of a comprehensive and many-sided program to encourage the efficient development of our natural resources and to assure that these industries will make the maximum contribution to the expansion of employment, national income and national wealth after the war. Natural resources, of course, are for the most part in the hands of the provinces, but the dominion, it is believed, can do much to promote full development and wise conservation. Tax policy may be one of the devices which it may appropriately use to these ends but it will be by no means the only one. The dominion's program should be part of an integrated program worked out in co-operation with the provinces. At the forthcoming dominion-provincial conference, this program, it is proposed, should be discussed with Provincial Governments and agreement reached as to the contribution to be made by the respective levels of government.

"For these reasons I believe that any radical changes in tax policy of special application only to the mining and oil companies would be premature at this time. The Excess Profits Tax Act already includes a special formula for the taxation of oil wells and gold mines. New companies in the metalliferous mining field enjoy a three-year exemption from excess profits tax. In last year's budget we made a number of important concessions to encourage exploration and drilling for oil and also made it possible for mining companies to write off exploration and prospecting expenses incurred in prospecting anywhere in Canada for base metals or strategic

minerals. With this measure of encouragement the oil and mineral industries have been able to make a very important contribution to the country's war effort. They have also been willing to bear their full share of the burden of financing the war and they well recognize, I believe, that the need for war revenue continues at least as great and as urgent as ever. The changes I have announced in respect of income and excess profits taxation and the indications I have given in regard to future tax policy will apply to these industries as well as to other industrial enterprises and I hope that it may be possible to announce at the next session of parliament the comprehensive and integrated program for the development and conservation of natural resources to which I have already referred."

CANADIAN METALS CONTROLLER'S ORDER 19

In June 1942 the Metals Controller issued Order M.C. 19 which restricted the production, development and new installations in non-essential mines. This order was issued for the following reasons:

1. To conserve labour and materials which were urgently required for more essential purposes.
2. To maintain the operating gold mines and to aid them in securing components for machinery and equipment for maintenance and repair, safety appliances and pumping machinery from the United States. Arrangements to this effect were made with the War Production Board.

By restricting gold mining operations this order restricted the employment of underground men in these mines and new gold properties and, therefore, made available more underground men for essential base metal mine production. Despite these curtailments of actual mining operations there never were any restrictions on prospecting and surface development of new properties.

Following the victory in Europe in 1945 there was some easing in the regulations governing the procurement of component parts and equipment from the United States. The Labour Department gave the Metals Control Office assurance that they through National Selective Service were able, and would continue, to direct men to the base metal mines in order to maintain necessary production and, therefore, on June 7, 1945, this order was rescinded and the only restrictions remaining on gold mining operations were the availability of materials and labour. The availability of sufficient component parts, etc., from the United States for the maintenance of operating gold mines presents no difficulty but some difficulty may be encountered in obtaining equipment for new mines. While the base metal mines are still in need of approximately 3,000 men, the majority of which are underground men, the Labour Department feels that there are certain areas in which there is a small surplus of underground workers and these are being allowed to seek employment in existing gold mines or on new properties.

ACTIVITIES OF WARTIME METALS CORPORATION

(Metals Controller—Department of Munitions and Supply)

Wartime Metals Corporation, a wholly owned Crown Company operating under the Department of Munitions and Supply was incorporated without share capital on March 27, 1942. The Corporation was created to assume the responsibility of administering, directing, operating and supervising such mining and metallurgical projects as the Minister of Munitions and Supply found necessary, in order to meet serious shortages of certain metals and minerals.

Where it was considered advisable for the Government to provide capital assistance in order that a specified metal or mineral be produced, definite recommendations were made by the Metals Controller to the Minister of Munitions and Supply, and upon approval by the Minister, Wartime Metals Corporation was directed to proceed with the work involved.

The Corporation also performed similar duties in connection with all mining projects operated in Canada by His Majesty for the account of various United States governmental agencies.

During its life of approximately three and one half years, Wartime Metals Corporation undertook 19 projects, 8 of which were conducted on behalf of the United States government, including all the production of copper, lead, zinc and corundum noted below:

1. Tetreault Zinc Lead
2. Granby Copper No. 2
3. Kam Kotia Copper
4. Twin "J" Copper Zinc
5. Britannia Copper
6. Kootenay Florence Zinc Lead
7. Lake Geneva Zinc Lead
8. Craigmont Corundum

For the first seven projects listed above, Metals Reserve was fully reimbursed by Canada on July 15, 1944, and the agreement between Metals Reserve and War Supplies Ltd. was cancelled. The reimbursement included capital expenditures and the difference between cost and the U.S. ceiling price of metals delivered in cases where cost exceeded the U.S. ceiling price. Craigmont Corundum is still in operation under the supervision of the Metals Control.

The remainder of the projects was undertaken to meet the threatened shortages, mainly in Canada but partly in Great Britain. Of these the five listed below proved to be impractical and were discontinued after short initial periods:

1. Lava Talc
2. Granby Copper No. 1.
3. High Lake Molybdenite
4. Zenith Molybdenite
5. Vanadium

The six remaining projects are listed below together with their approximate production during their period of operation.

1. Dominion Magnesium	22,300,000 lbs.	magnesium
2. Chromeraine (Chrome Ore)	12,353,000	" chromium content
3. La Corne Molybdenum	1,430,000	" molybdenum content
4. Emerald Tungsten	272,000	" WO ₃
5. Ingot Brass	1,050,000	" Brass Ingots
6. Molybdenite Roasting	1,357,713	" molybdenum oxide
	225,103	" ferromolybdenum
	201,325	" molybdenum in stock at Climax

STRATEGIC MINERALS

The annual report of the Department of Mines and Resources, Ottawa, for the fiscal year ended March 31, 1944 contained the following information:

"The Special Minerals Projects Division (Mines and Geology Branch) administered funds provided by the Branch out of the war appropriation for exploration and development work in connection with the supply of strategic minerals; for investigation of petroliferous deposits and potential petroliferous areas; for the remodelling and expansion of the plant of Abasand Oils Limited, near Fort McMurray, Alberta; for assistance to provincial governments in providing transportation facilities into strategic mineral properties; and for assistance to provincial governments in winter maintenance of roads into strategic mineral properties. Funds recoverable from other departments were also administered by the division in connection with the production of fluorspar and tungsten.

"An Allotment of \$500,000 from war appropriation was provided for continuation of exploration and development work in connection with the supply of strategic minerals, including the administration of projects involving loans to producers of chromite at St. Cyr, Quebec, of fluorspar in the Madoc area, Ontario, and of tungsten in Yukon. Exploratory drilling of potential areas in Manitoba was carried out by contractors under the supervision of the Branch. Development of muscovite mica and fluorspar properties in Ontario was assisted through the leasing of Government-owned mining equipment at low rentals. The projects were carried out on the recommendation of the Metals Controller"

Table 13.—Mineral Production of Nova Scotia, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony.....pound						
Copper.....fine oz.	12,989	500,076	4,129	158,967	5,840	224,840
Gold.....pound						
Lead.....pound	61	91				
Manganese ore.....pound						
Manganese metal.....fine oz.	446	188	144	65	188	81
Silver.....pound	4,300	3,967	19,374	18,564		
Tungsten concentrates.....pound						
Zinc.....pound						
NON-METALLICS—						
Barytes.....tons	17,750	172,060	22,550	263,419	106,106	970,774
Coal.....tons	7,204,852	29,116,118	6,103,085	27,121,861	5,745,671	30,728,535
Diatomite.....tons	218	6,541	82	2,465	5	175
Fluorspar.....tons	300	6,584	825	17,000		
Grindstones.....tons						
Gypsum.....tons	394,216	512,762	255,736	368,639	401,284	489,932
Quartz.....tons	10,708	23,557	9,486	16,126	10,100	27,350
Salt.....tons	50,199	317,798	47,775	245,157	38,809	281,482
Silica brick.....M	3,090	142,511	3,113	169,783	2,931	177,003
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		618,441		478,571		402,694
Lime—						
Quicklime.....tons	21,540	222,304	9,611	111,758	3,362	42,957
Hydrated lime.....tons	310	4,030	122	1,586		
Sand and gravel.....tons	775,795	371,970	917,376	585,007	911,970	411,041
Stone.....tons	229,517	764,167	247,868	420,869	98,433	225,113
Total.....		32,783,165		29,979,837		33,981,977

Table 14.—Mineral Production of New Brunswick, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Iron ore.....tons			143,062	579,990		
Manganese ore.....tons	374	8,841	48	985		
NON-METALLICS—						
Coal.....tons	435,203	1,826,403	372,873	1,641,069	345,123	1,845,277
Grindstones.....tons	216	10,000	164	6,225	225	12,000
Gypsum.....tons	36,623	111,316	36,263	148,315	42,040	200,748
Natural gas.....M cu. ft.	619,380	299,688	675,029	327,787	702,464	341,636
Petroleum.....brls.	28,089	39,467	24,530	34,342	23,296	32,832
Peat Moss.....tons	295	8,100	990	27,000	2,000	64,000
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		246,041		216,446		207,051
Lime—						
Quicklime.....tons	16,217	146,357	13,634	132,901	17,218	195,545
Hydrated lime.....tons	6,210	51,124	3,748	41,467	2,580	32,102
Sand and gravel.....tons	923,020	540,541	719,531	372,936	1,960,382	958,524
Stone.....tons	87,937	321,280	53,583	147,371	69,988	244,187
Total.....		3,609,158		3,676,834		4,133,902

Table 15.—Mineral Production of Quebec*, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As ₂ O ₃).....lb.	6,349,074	428,502	2,744,921	221,085	2,268,067	153,944
Chromite.....tons	11,456	343,568	29,595	919,878	27,054	748,494
Copper.....lb.	140,911,876	14,212,372	131,163,776	15,411,744	108,055,172	12,966,620
Gold.....fine oz.	1,092,388	42,056,938	922,533	35,517,521	746,784	28,751,184
Iron ore.....tons	187	935				
Lead.....lb.	437,634	14,713	2,435,523	91,430	10,487,842	471,953
Magnesium metal (a).....lb.	141,081	62,076				
Molybdenite concentrates.....lb.	222,276	131,906	784,715	549,515	2,124,693	1,078,616
Selenium.....lb.	326,208	626,319	216,498	378,872	146,352	263,434
Silver.....fine oz.	1,655,042	697,855	2,212,115	1,001,071	2,500,681	1,075,293
Tellurium.....lb.						
Titanium ore, sold for export.....tons	10,031	50,906	69,437	308,290	33,973	165,195
Tungsten concentrates.....lb.	2,981	2,612	5,401	5,369		
Zinc.....lb.	73,940,811	2,522,121	128,169,810	5,126,792	137,378,439	5,907,273
NON-METALLICS—						
Asbestos.....tons	439,459	22,663,283	467,196	23,169,505	419,265	20,619,516
Barite.....tons						
Feldspar.....tons	16,802	164,588	17,199	176,222	17,842	177,271
Fluorspar.....tons					18	670
Iron oxides (ochre).....tons	8,866	147,049	7,998	131,057	8,117	142,050
Magnesitic dolomite and brucite.....tons		1,059,374		1,260,056		1,139,281
Mica.....tons	1,328	285,263	1,543	245,846	1,137	178,899
Natural mineral waters.....Imp. gal.	129,062	60,316	125,605	61,793	148,965	78,226
Peat fuel.....tons			522	4,440	444	3,597
Peat moss.....tons	12,982	197,560	14,398	298,307	19,033	359,724
Phosphate.....tons	930	12,973	1,050	14,272	482	6,716
Quartz.....tons	203,219	543,817	214,959	605,916	236,091	639,429
Soapstone.....tons	14,369	136,529	14,204	135,469	19,013	204,127
Sulphur.....tons	168,832	673,965	136,007	545,229	116,887	453,501
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	4,446,416	6,487,078	3,394,895	4,899,578	3,249,302	4,736,004
Clay products.....brls.		1,741,297		1,504,428		1,881,791
Lime—						
Quicklime.....tons	263,321	1,981,535	2,857,94	2,331,293	250,616	2,167,913
Hydrated lime.....tons	85,255	342,172	96,638	336,098	88,466	336,165
Sand and gravel.....tons	11,026,249	2,485,853	10,601,376	2,362,635	8,541,400	2,140,856
Stone.....tons	4,188,210	4,166,465	3,427,325	3,996,967	2,593,842	3,334,811
Total.....		104,300,910		101,610,678		90,182,553

(a) Produced in Ontario from Quebec brucite.

* There is also in this province an important production of aluminum from imported ores.

† Includes some talc.

Table 16.—Mineral Production of Ontario, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Arsenic (As_2O_3).....lb.	1,504,049	152,331	408,617	32,924	358,955	26,922
Bismuth.....lb.	2,333	3,219				
Chromite.....tons						
Cobalt.....lb.	(a) 83,871	88,444	(a) 175,961	191,407	(a) 36,283	34,106
Copper.....lb.	308,282,414	30,625,404	277,840,560	32,232,027	285,307,278	33,845,632
Gold.....fine oz.	2,763,819	106,407,032	2,117,215	81,512,777	1,731,836	66,675,686
Iron ore.....short tons	545,119	1,516,142	498,232	1,452,250	553,252	1,909,608
Lead.....lb.	3,183,159	107,018	2,273,896	85,362	1,065,741	47,958
Magnesium metal.....lb.	473,910	208,520	7,153,974	2,074,652	10,579,878	2,575,695
Molybdenite (concentrates).....lb.	423	150			2,815	1,082
Nickel.....lb.	285,211,803	69,998,427	288,018,615	71,675,322	274,598,629	69,204,152
Palladium, rhodium, etc.....fine oz.	222,573	8,279,221	126,004	5,233,068	42,929	1,990,085
Platinum.....fine oz.	285,188	10,897,033	219,706	8,458,681	157,523	6,064,635
Selenium.....lb.	76,000	145,920	82,000	143,500	65,000	117,000
Silver.....fine oz.	4,452,787	1,877,562	2,671,320	1,208,879	3,143,275	1,351,698
Tellurium.....lb.	9,500	15,200	8,600	15,050	9,900	17,325
Tungsten concentrates.....lb.	162,185	145,241	494,405	356,478	63,152	5,212
Zinc.....lb.	4,710,394	160,671	3,299,812	131,993	2,429,176	104,455
Non-METALLICS—						
Asbestos.....tons						
Barite.....tons					173	17,111
Corundum.....tons					5,667	50,361
Feldspar.....tons	5,468	49,353	6,659	61,549	6,906	217,031
Fluorspar.....tons	4,340	113,957	10,385	301,424	3	90
Garnet (schist).....tons	17	176			1,582	171,166
Graphite.....tons		117,904	1,903	197,431	90,288	348,873
Gypsum.....tons	82,796	304,170	92,448	335,637	1,743	646,745
Mica.....tons	1,400	89,243	2,127	296,189	7,185	805
Natural mineral waters.....Imp. gal.	28,023	14,189	14,006	5,748	7,032,508	4,694,097
Natural gas.....M cu. ft.	10,476,770	6,809,901	7,914,408	6,543,913	47,625	217,989
Nepheline syenite.....tons		246,893		292,010	200	1,800
Peat (fuel).....tons	172	1,204	260	2,560	12,490	144,820
Peat (moss).....tons	9,427	147,729	11,120	136,595	125,067	296,420
Petroleum.....brls.	143,845	306,242	132,492	311,356		
Phosphate.....tons	334	4,458	401	4,113		
Quartz (b).....tons	1,367,733	914,256	1,350,640	852,196	1,326,288	868,389
Salt.....tons	558,407	2,793,328	594,889	3,356,870	603,806	2,906,117
Silica brick.....M	1,183	120,495	1,052	125,722	1,066	135,089
Sulphur.....tons	18,634	186,340	16,907	169,070	17,876	178,760
Talc.....tons	15,499	174,295	11,959	131,216	13,584	153,122
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	2,784,782	3,998,294	1,972,009	2,872,732	1,863,210	2,730,381
Clay Products.....brls.		2,549,486		2,453,829		2,347,396
Lime—						
Quicklime.....tons	382,667	2,761,643	382,950	2,794,071	391,678	2,886,778
Hydrated lime.....tons	33,031	363,931	28,971	321,123	37,607	424,399
Sand and gravel.....tons	8,420,358	3,433,986	8,285,309	3,620,852	9,529,803	4,417,427
Stone.....tons	3,106,545	2,985,938	3,206,027	2,958,383	2,988,283	2,909,980
Total.....		259,114,946		232,948,959		210,706,307

† Sulphur content of pyrites shipped and estimated sulphur salvaged from smelter gases.

(a) Exclusive of metal in ore placed on Government stock pile at Deloro, Ontario, but includes any metal reshipped from stock pile.

(b) Includes low grade silica sand for fluxing purposes.

Table 17.—Mineral Production of Manitoba, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium.....lb.	29,236	34,498	20,983	24,130	20,921	23,013
Copper.....lb.	47,595,586	4,800,491	38,014,872	4,466,747	43,878,639	5,265,437
Gold.....fine oz.	136,226	5,244,701	91,775	3,533,337	74,168	2,855,468
Selenium.....lb.	21,209	40,721	5,239	9,168	12,957	23,323
Silver.....fine oz.	821,824	346,530	587,279	265,767	569,873	245,045
Tellurium.....lb.	361	578	†	†	113	198
Thallium.....lb.					128	1,690
Tungsten concentrates.....lb.	1,399	1,300	16	16		
Zinc.....lb.	29,908,179	1,020,168	46,783,873	1,871,355	45,822,278	1,970,358
NON-METALLICS—						
Coal.....tons	1,265	3,763	999	2,964		
Feldspar.....tons						
Gypsum.....tons	29,218	179,780	37,989	380,529	38,330	368,498
Lithium minerals.....\$						
Natural gas.....cu. ft.	(b)	(b)	(b)	(b)	(b)	(b)
Peat moss.....tons	2,224	55,832	2,042	72,687	1,128	41,878
Salt.....tons	22,706	397,101	27,523	497,227	27,267	488,776
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	654,855	1,374,498	793,913	1,503,416	865,756	1,698,567
Clay products.....		80,890		132,382		197,383
Lime.....						
Quicklime.....tons	21,443	181,052	24,962	216,414	20,428	178,876
Hydrated lime.....tons	4,981	84,027	5,076	91,405	9,466	122,256
Sand and gravel.....tons	1,443,001	427,150	1,048,673	293,938	1,102,448	296,086
Stone.....tons	43,488	71,966	37,974	50,784	31,929	53,554
Total.....		14,345,046		13,412,266		13,830,406

† No commercial recovery reported by smelter; sometimes recovered by copper refiner but not paid for.

(b) No official reports received; estimated in previous years.

Table 18.—Mineral Production of Saskatchewan, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Cadmium.....lb.	147,314	173,831	166,955	191,998	119,639	131,603
Copper.....lb.	56,781,466	5,726,979	85,948,719	10,098,974	73,514,499	8,821,740
Gold.....fine oz.	178,871	6,886,533	174,090	6,702,465	122,782	4,727,107
Selenium.....lb.	71,952	138,148	70,276	122,983	74,283	133,709
Silver.....fine oz.	2,664,132	1,123,358	2,812,624	1,272,825	1,735,773	746,382
Tellurium.....lb.	1,223	1,957	†	†	648	1,134
Zinc.....lb.	84,461,520	2,880,983	96,350,404	3,854,016	87,130,087	3,746,594
NON-METALLICS—						
Coal.....tons	1,301,116	1,760,065	1,665,972	2,432,249	1,372,766	2,034,914
Quartz (a).....tons	155,699	54,495	163,102	57,086	143,101	50,085
Salt.....tons						
Sodium sulphate.....tons	131,258	1,079,692	107,121	1,025,151	102,421	987,842
Natural gas.....M cu. ft.	117,124	45,555	116,201	45,568	119,116	46,656
Petroleum crude.....brls.						
Volcanic dust.....tons			50	237		
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Clay products.....		271,325		348,725		330,907
Sand and gravel.....tons	679,979	435,798	1,288,263	583,687	1,163,097	533,175
Total.....		20,578,749		26,735,984		22,291,848

(a) Low grade silica sand for fluxing purposes.

† No commercial recovery reported. See footnote preceding table.

Table 19.—Mineral Production of Alberta, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Gold.....fine oz.	34	1,309	21	808	51	1,963
Silver.....fine oz.	2	1	1		4	2
NON-METALLICS—						
Bituminous sands.....tons	(a)	(a)	(a)	(a)	(a)	(a)
Coal.....tons	7,754,053	22,624,410	7,676,726	24,030,686	7,428,708	26,814,937
Natural gas.....M cu. ft.	34,482,585	6,146,146	35,569,078	6,241,815	37,161,570	6,339,817
Peat moss.....tons	58	1,380	55	1,425		
Petroleum.....brls.	10,117,073	15,514,665	9,601,630	15,724,518	8,727,366	14,468,061
Salt.....tons	22,360	335,960	17,499	280,124	25,335	397,646
Sodium sulphate.....tons						
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	668,043	1,307,353	606,703	1,176,442	699,989	1,370,502
Clay products.....		1,013,497		978,649		1,143,577
Lime—						
Quicklime.....tons	18,117	148,720	17,482	142,125	18,102	151,457
Hydrated lime.....tons	704	7,040	733	7,330	750	7,500
Sand and gravel.....tons	481,644	218,914	626,157	309,389	833,524	328,151
Stone.....tons	12,028	40,436	13,961	47,899	12,726	43,049
Total.....		47,359,831		48,941,210		51,066,662

(a) Included with petroleum refining; no crude sands sold.

Table 20.—Mineral Production of British Columbia, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony.....lb.	3,041,030	516,975	1,114,166	189,408	1,937,933	281,000
Arsenic (As ₂ O ₃).....lb.	7,114,751 (b)	71,148	(a)	(a)	(a)	(a)
Bismuth.....lb.	345,223	476,408	407,597	562,484	123,875	154,844
Cadmium.....lb.	972,413	1,147,447	598,673	688,474	386,410	425,051
Copper.....lb.	50,015,521	5,044,565	42,222,205	4,961,109	36,302,628	4,356,315
Copper.....fine oz.	474,338	18,262,052	241,346	9,291,821	196,857	7,578,994
Gold.....fine oz.	471	4,710				
Indium.....lb.	507,199,704	17,052,054	439,155,035	16,485,902	292,922,888	13,181,530
Lead.....lb.	193,727	85,240				
Magnesium.....lb.	1,035,914	2,943,807	1,690,240	4,559,200	735,908	1,210,375
Mercury.....lb.	4,887	2,907				
Molybdenite.....fine oz.	40	1,528	7	270		
Platinum.....lb.	10,596,204	4,467,996	8,995,488	4,070,818	5,631,572	2,421,576
Silver.....lb.	1,237,863	643,689	776,937	450,623	516,626	299,643
Tin.....lb.	250,930	228,590	976,622	692,260	818,000	236,788
Tungsten concentrates.....lb.	387,236,469	13,208,636	336,150,455	13,446,018	278,063,373	11,956,725
Zinc.....lb.						
NON-METALLICS—						
Barite.....tons	1,917	16,084	1,924	15,834	12,613	52,922
Coal.....tons	2,168,541	7,566,822	2,039,402	7,648,720	2,134,231	9,009,506
Diatomite.....tons	147	2,547	16	866	8	262
Fluorspar.....tons	1,559	25,498				
Gypsum.....tons	23,313	146,154	24,412	148,348	24,222	103,927
Iron oxides (ochre).....tons	438	4,604	403	4,836	482	8,200
Magnesium sulphate.....tons	1,140	38,760				
Mica (schist).....tons	281	9,061	355	11,821	462	15,382
Peat moss.....tons	28,520	658,771	35,755	925,408	45,794	1,259,131
Quartz.....tons	815	2,037	38,562	77,124	24,682	73,156
Sodium carbonate.....tons	256	2,048	468	5,148	44	484
Sulphur*.....tons	116,248	1,134,586	104,601	1,039,126	113,325	1,123,478
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—						
Cement.....brls.	571,945	1,198,014	534,769	1,146,865	512,594	1,085,918
Clay Products.....		560,746		495,163		483,626
Lime—						
Quicklime.....tons	25,977	204,438	31,714	261,526	36,798	324,553
Hydrated lime.....tons	5,057	32,466	6,333	43,895	8,071	56,343
Sand and gravel.....tons	2,599,861	1,001,202	2,257,784	877,413	4,357,362	1,194,859
Stone.....tons	310,341	393,342	236,212	341,906	199,791	348,483
Total.....		77,247,932		68,442,386		57,246,071

* Includes sulphur content of pyrites shipped and estimated sulphur contained in sulphuric acid and other products made from waste smelter gases.

(a) Considerable arsenic is contained in auriferous quartz ores exported. However, this is not paid for and data relating to its possible recovery are unobtainable.

(b) Estimated.

Table 21.—Mineral Production of Yukon and the North West Territories, 1942-1944

Product	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$
METALLICS—						
Antimony.....lb.	78	13				
Gold.....fine oz.	83,246	3,204,971	41,160	1,584,660	23,818	916,993
Lead.....lb.	1,322,065	44,448	195,715	7,347	105,727	4,758
Silver.....fine oz.	482,133	203,296	52,348	23,690	32,066	13,788
Tungsten concentrates.....lb.	968	840	12,083	10,122	5,593	3,780
NON-METALLIC—						
Coal.....tons						
Total		3,453,568		1,625,819		939,319
Copper.....lb.	74,963	7,561			11,902	1,428
Gold.....fine oz.	99,394	3,826,669	59,032	2,272,732	20,775	799,838
Pitchblende products.....	(a)	(a)	(a)	(a)	(a)	(a)
Natural gas.....M cu. ft.	1,500	335	1,500	335	1,500	335
Silver.....fine oz.	22,531	9,500	13,250	5,996	13,677	5,881
Petroleum, crude.....brls.	75,789	108,477	293,750	400,201	1,223,675	632,587
Tungsten concentrates.....lb.	98,218	23,725	720	729		
Total		3,976,267		2,679,993		1,440,069

(a) Data not available for publication, recovered in refinery located at Port Hope, Ontario.

NOTE.—For complete data relating to Canadian Mineral Production, by Provinces, see Annual Mineral Production Report for 1942.

Table 22.—Tonnage of Ore Mined and Rock Quarried in the Canadian Mining Industry, 1942, 1943 and 1944

	1942	1943	1944
Gold quartz ores.....	17,722,866	12,853,610	10,790,495
Copper-gold-silver ores.....	8,575,626	8,251,579	7,395,608
Nickel-copper ores.....	12,081,545	12,925,590	12,954,201
Silver-cobalt ores.....	25,550	39,184	27,184
Silver-lead-zinc ores.....	2,951,480	3,252,657	2,911,824
Miscellaneous metals (iron ore etc.).....	1,120,478	1,359,008	1,250,800
Asbestos.....	8,233,516	7,929,471	7,778,805
Feldspar and nepheline syenite.....	77,049	90,416	84,089
Quartz, exclusive of sand (shipments).....	487,664	947,195	988,758
Gypsum and anhydrite.....	794,886	430,822	536,356
Talc and soapstone.....	30,376	22,128	30,553
Iron oxides.....	15,629	12,648	15,519
Other non-metals.....	457,251	529,326†	536,957†
Stone, all kinds, quarries (exclusive of stone used for cement and lime).....	7,978,066	7,222,950	5,994,992
Stone used for the manufacture of cement.....	2,155,750	1,994,202	1,939,900
Estimate rock for the manufacture of lime.....	1,574,508	1,614,481	1,571,451
Total (other than coal)	64,282,240	59,475,267	54,807,492
Total coal	18,865,030	17,859,057	17,026,499

For years 1922 to 1941, see Annual Mineral Production Report, year 1941.

† Exclusive of Peat and Peat Moss.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1940-1944

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (c)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
Metal Mining Industries							
ALLUVIAL GOLD MINES							
1940.....	125	126	9,933,894	840	1,680,779	298,680	3,820,169
1941.....	108	110	10,755,706	797	1,954,278	332,361	3,800,142
1942.....	80	80	10,071,917	471	1,283,274	206,635	4,114,995
1943.....	43	43	11,372,849	237	646,283	157,758	1,892,214
1944.....	47	47	(f)	211	598,556	84,104	1,197,021
AURIFEROUS QUARTZ MINES							
1940.....	428	438	250,919,160	31,405	55,205,096	32,076,741	146,713,744
1941.....	338	357	243,138,864	32,551	62,150,810	33,124,349	145,978,833
1942.....	223	227	245,240,997	26,030	54,388,872	28,625,881	131,938,902
1943.....	151	156	212,675,979	19,038	40,665,283	21,236,137	95,597,710
1944.....	257	262	(f)	17,226	37,023,505	19,029,032	75,234,384
COPPER-GOLD-SILVER MINES							
1940.....	25	26	60,446,948	6,115	10,777,827	25,370,357	**27,804,419
1941.....	21	22	81,521,902	5,866	10,695,023	34,608,742	30,220,331
1942.....	26	28	84,776,243	5,646	11,097,412	35,450,148	33,688,642
1943.....	20	22	94,750,186	5,748	11,806,827	29,695,643	43,840,679
1944.....	23	26	(f)	5,175	10,710,071	24,191,776	38,198,039
SILVER-COBALT MINES							
1940(d).....	43	44	337,080	123	158,024	57,347	809,263
1941.....	24	14	439,877	182	229,984	126,372	662,443
1942.....	13	14	358,691	192	283,980	150,043	600,207
1943.....	20	21	587,039	221	290,654	142,312	578,861
1944.....	10	11	(f)	165	260,575	99,600	323,260
SILVER-LEAD-ZINC-MINES*							
1940.....	82	83	19,969,198	1,585	3,052,532	4,380,568	16,439,530
1941.....	63	64	17,717,334	1,666	3,452,199	3,624,765	20,653,212
1942.....	44	44	19,484,442	2,185	4,730,370	4,268,352	23,504,642
1943.....	31	32	20,603,191	3,097	6,423,724	5,140,238	21,932,644
1944.....	20	20	(f)	2,769	5,810,290	4,489,198	16,802,759
NICKEL-COPPER MINES							
1940.....	3	6	36,765,154	6,372	12,256,863	6,783,621	34,240,459
1941.....	3	6	41,730,329	6,490	13,680,994	7,214,448	41,525,277
1942.....	4	8	48,303,780	7,147	15,365,207	8,186,777	50,801,633
1943.....	6	10	52,250,437	7,270	15,863,646	8,896,063	54,324,097
1944.....	5	9	(f)	7,628	14,678,695	9,048,726	54,621,059
MISCELLANEOUS METAL MINES							
1940.....	36	36	2,720,642	445	628,025	720,173	1,309,105
1941.....	46	47	2,931,695	725	1,141,244	1,355,563	2,073,323
1942.....	68	67	3,956,427	1,352	2,396,731	1,519,686	3,996,555
1943.....	54	59	15,603,307	1,964	4,295,153	2,540,873	6,521,495
1944.....	27	27	(f)	1,385	2,809,013	2,057,850	3,303,143
NON-FERROUS METAL SMELTING AND REFINING							
1940.....	9	13	234,826,742	13,466	21,766,197	(b)207,301,259	+ 98,059,298
1941.....	9	13	309,963,342	16,014	27,482,689	(b)259,585,976	+119,736,294
1942.....	10	15	356,052,965	21,162	37,340,556	(b)321,736,152	+125,881,047
1943.....	9	16	392,217,159	26,749	48,491,732	(b)399,156,356	+111,857,020
1944.....	9	16	(f)	23,927	44,536,991	(b)350,903,763	+123,303,038
Total Metal Mining Industries							
1940.....	756	772	615,918,818	60,351	105,525,343	276,988,746	**329,196,007
1941.....	612	633	708,199,049	64,291	120,787,221	339,972,576	364,649,855
1942.....	(a)468	493	765,245,462	64,185	126,886,402	400,132,674	374,526,623
1943.....	(d)334	359	800,060,147	64,324	128,483,302	467,165,350	336,544,720
1944.....	(e)398	418	(f)	53,486	116,427,696	409,904,049	312,982,733

*Contains data relating to silver-pitchblende ores in the Northwest Territories. †Value added by smelting.

(b) Includes fuel and electricity used for metallurgical purposes and cost of ores, etc., treated which were \$174,274,655 in 1940, \$213,542,005 in 1941, \$258,903,818 in 1942, \$317,917,186 in 1943 and \$281,266,002 in 1944.

(c) See end of table.

(a) 371 producing. ** Revised data. (d) 285 producing. (e) 213 producing. (f) not reported.

DOMINION BUREAU OF STATISTICS

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1940-1944—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) (a) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (c) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
Total Non-Metal Mining Industries, Including Fuels							
*FUELS							
COAL							
1940.....	491	527	103,634,890	26,434	34,043,162	8,996,231	43,553,679
1941.....	417	469	106,498,356	26,330	38,149,602	9,680,614	45,780,856
1942.....	380	419	108,766,697	26,235	42,091,137	10,965,528	49,473,229
1943.....	356	413	111,867,036	26,473	47,291,919	11,551,496	48,329,450
1944.....	341	394	.....	25,596	55,020,537	12,712,820	54,344,700
NATURAL GAS							
1940.....	236	3,438	80,487,766	2,189	2,748,740	94,354	11,108,749
1941.....	231	3,424	81,280,541	2,161	2,841,795	108,204	11,114,899
1942.....	212	3,566	82,768,602	1,940	2,826,811	104,802	11,251,548
1943.....	191	3,558	83,963,163	1,882	2,846,514	189,740	11,362,956
1944.....	211	3,621	.....	1,810	2,885,654	201,152	9,571,205
PETROLEUM							
1940.....	300	2,360	53,216,853	1,741	2,835,410	1,467,995	10,018,083
1941.....	272	2,312	58,206,984	1,844	3,254,817	803,798	14,207,526
1942.....	242	2,253	54,707,282	1,972	3,648,965	1,207,463	15,668,660
1943.....	233	2,197	59,058,622	2,399	5,212,895	912,358	15,994,422
1944.....	224	2,264	.....	2,547	5,814,676	1,242,795	14,575,563
TOTAL FUELS							
1940.....	1,087	6,325	237,339,509	30,264	39,627,312	10,558,580	64,679,511
1941.....	920	6,205	245,985,881	30,335	44,246,214	10,592,616	71,103,281
1942.....	834	6,238	246,242,581	30,117	48,566,913	12,277,793	76,393,437
1943.....	780	6,168	254,888,821	30,754	55,351,328	12,653,594	75,686,828
1944.....	776	6,279	.....	29,953	63,720,867	14,156,767	78,491,468
OTHER NON-METAL MINING INDUSTRIES							
ASBESTOS							
1940.....	8	9	19,799,280	3,886	4,728,702	3,720,968	11,903,688
1941.....	9	10	21,325,558	3,760	4,996,101	4,246,246	17,229,399
1942.....	8	10	18,741,364	3,749	5,299,454	4,393,973	18,277,235
1943.....	9	10	20,831,427	3,844	5,576,734	4,509,876	19,899,540
1944.....	9	10	.....	4,060	6,401,185	4,016,059	17,820,317
FELDSPAR, QUARTZ AND NEPHELINE SYENITE							
1940.....	44	46	2,174,258	400	377,254	214,517	1,294,482
1941.....	38	38	2,314,582	506	610,489	250,983	1,587,071
1942.....	36	38	2,563,248	533	782,903	412,028	1,586,968
1943.....	35	37	2,895,131	535	768,199	453,832	1,681,377
1944.....	41	42	.....	529	772,385	467,937	1,636,093

* Production of peat since 1929 included with the other non-metallics.

(c) See footnote at end of table. (a) not reported in 1944.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1940-1944—Continued

1 Year	2 Number of active firms	3 Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	4 Capital employed (excluding ore reserves or other unmined material) (a) \$	5 Number of employees	6 Salaries and wages \$	7 Cost of process supplies, purchased electricity and fuel also freight and smelter charges (c) \$	8 Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries \$
OTHER NON-METAL MINING INDUSTRIES—Continued							
GYPSUM							
1940.....	9	16	4,648,662	694	717,666	418,339	1,647,594
1941.....	8	15	5,175,821	648	745,008	452,008	1,796,420
1942.....	7	13	4,386,531	510	657,620	244,139	1,010,043
1943.....	6	12	5,147,424	438	617,780	248,043	1,133,425
1944.....	8	14	.....	328	490,872	387,941	1,124,037
IRON OXIDES (OCHRE)							
1940.....	7	7	195,263	46	38,842	18,033	93,841
1941.....	4	4	189,877	44	42,152	21,394	120,675
1942.....	5	5	194,541	47	44,288	26,615	125,038
1943.....	5	5	254,891	47	46,554	27,028	108,865
1944.....	6	6	.....	55	49,876	37,485	112,765
MICA							
1940.....	65	65	259,168	218	134,705	27,829	209,316
1941.....	81	81	1,180,097	246	181,800	39,529	295,759
1942.....	106	106	1,460,769	361	258,605	37,313	346,254
1943.....	78	78	458,402	430	357,992	54,395	499,461
1944.....	70	70	.....	400	359,797	56,024	784,402
PEAT (d)							
1940.....	(b) 22	(b) 22	(b) 825,154	(b) 667	(b) 486,116	(b) 17,472	(b) 628,936
1941.....	35	35	3,212,921	1,316	1,380,142	277,086	1,031,211
1942.....	44	44	2,477,287	1,012	1,000,348	307,674	1,384,770
1944.....	39	39	.....	1,183	1,154,009	353,376	1,780,000
SALT							
1940.....	9	9	4,993,914	586	836,506	860,768	2,461,482
1941.....	9	9	5,559,307	668	1,018,652	1,175,966	2,676,533
1942.....	9	9	5,687,511	675	1,114,574	1,419,248	3,173,755
1943.....	9	9	5,490,594	682	1,223,009	1,539,774	3,648,854
1944.....	8	9	.....	710	1,302,143	1,498,424	3,287,660
TALC AND SOAPSTONE							
1940.....	8	8	319,398	94	80,879	37,130	192,509
1941.....	8	8	695,581	148	128,820	55,206	305,603
1942.....	10	10	567,665	115	113,601	59,113	251,711
1943.....	8	8	576,691	90	101,719	58,031	208,654
1944.....	6	6	.....	113	133,883	68,165	289,084
MISCELLANEOUS							
1940.....	46	46	2,491,527	547	703,501	608,028	1,508,728
1941.....	61	63	2,648,830	683	878,700	797,564	1,645,184
1942.....	61	64	4,919,871	811	1,142,072	952,860	2,053,307
1943.....	52	54	3,522,842	911	1,363,526	1,208,470	2,268,237
1944.....	50	52	.....	865	1,500,250	1,188,860	2,797,719

(a) Not reported in 1944.

(b) In 1940 peat moss and peat humus included with the manufacturing industry and peat fuel included with miscellaneous non-metals.

(c) See footnote at end of this table.

(d) Includes data on peat fuel, peat moss and peat humus.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries,
1940-1944—Continued

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) (a)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (c)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
TOTAL OTHER NON-METAL MINING INDUSTRIES							
1940.....	196	206	34,881,470	6,471	7,618,055	5,905,612	19,311,640
1941.....	240	250	39,914,807	7,370	9,087,838	7,056,368	26,285,580
1942.....	277	290	41,734,421	8,117	10,793,259	7,822,375	27,555,522
1943.....	246	257	41,654,689	7,989	11,055,861	8,410,143	30,333,183
1944.....	237	248	.....	8,233	12,164,400	8,104,871	29,632,077
Total Non-Metal Mining Industries, including Fuels							
1940.....	1,223	6,531	272,220,979	36,835	47,245,367	16,464,192	83,991,151
1941.....	1,160	6,455	285,900,688	37,705	53,334,052	17,648,984	97,388,861
1942.....	1,111	6,528	287,977,002	38,234	59,360,172	20,100,168	104,245,959
1943.....	1,026	6,425	296,543,510	38,743	66,407,189	21,063,737	106,520,011
1944.....	1,013	6,527	.....	38,186	75,885,267	22,261,638	108,123,545
Clay Products and Other Structural Materials							
CLAY PRODUCTS							
Brick, Tile and Sewer Pipe							
1940.....	132	136	16,569,424	2,343	2,488,390	1,402,681	4,581,541
1941.....	127	132	16,734,645	2,557	2,981,278	1,748,511	5,323,433
1942.....	111	115	17,181,503	2,152	2,777,171	1,420,355	5,016,090
1943.....	93	97	16,423,684	1,781	2,565,580	1,233,412	4,674,246
1944.....	98	102	.....	1,889	2,819,912	1,451,686	4,711,125
STONEWARE AND POTTERY							
1940.....	7	7	577,019	214	186,861	19,547	340,778
1941.....	10	10	642,908	324	246,507	20,062	453,330
1942.....	8	8	612,428	371	295,840	30,884	614,394
1943.....	8	8	739,063	392	344,261	28,395	672,140
1944.....	8	8	.....	358	356,892	66,816	767,798
TOTAL CLAY PRODUCTS*							
1940.....	139	143	17,146,443	2,557	2,675,251	1,422,228	4,922,319
1941.....	137	142	17,377,653	2,881	3,227,785	1,768,573	5,806,763
1942.....	119	123	17,793,931	2,523	3,073,011	1,451,239	5,630,484
1943.....	101	105	17,162,747	2,173	2,909,841	1,261,807	5,346,386
1944.....	106	110	.....	2,247	3,176,804	1,518,502	5,478,923
OTHER STRUCTURAL MATERIALS†							
CEMENT							
1940.....	3	8	50,370,276	1,052	1,515,766	4,291,221	8,715,422
1941.....	3	8	51,108,294	1,235	1,860,931	5,044,208	9,279,164
1942.....	3	8	51,121,894	1,241	2,059,337	5,414,487	10,213,916
1943.....	3	8	50,438,932	1,209	2,154,218	5,557,089	7,152,763
1944.....	3	8	.....	1,207	2,254,775	5,764,387	6,882,354

(*) Includes kaolin and other clays. (a) not reported in 1944.

(†) A considerable proportion of the values shown for lime and stone sales represents shipments for chemical purposes—see chapter 9.

(c) See footnote at end of this table.

Table 23.—Principal Statistics of the Mineral Industry in Canada, by Industries, 1940-1944—Concluded

1	2	3	4	5	6	7	8
Year	Number of active firms	Number of operating mines, oil and gas wells, quarries, gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) (a)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (c)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries
			\$		\$	\$	\$
<i>OTHER STRUCTURAL MATERIALS—Concluded</i>							
<i>LIME</i>							
1940.....	50	55	5,107,739	962	1,003,671	1,601,546	3,593,009
1941.....	45	50	4,633,946	1,105	1,321,571	2,196,529	4,161,412
1942.....	44	48	4,742,066	1,022	1,312,320	2,598,560	3,932,279
1943.....	41	45	4,607,651	898	1,408,393	1,924,482	4,908,510
1944.....	38	42	.....	815	1,414,426	2,046,550	5,005,235
<i>SAND AND GRAVEL</i>							
1940.....	1,458	5,596	3,456,502	4,243	3,744,585	291,008	11,468,237
1941.....	1,399	5,407	4,287,789	3,252	2,995,526	474,647	9,901,076
1942.....	1,419	5,217	4,477,547	2,141	2,404,755	677,149	8,328,265
1943.....	1,387	5,054	3,674,501	2,320	2,683,257	379,435	8,626,422
1944.....	1,541	5,381	.....	1,773	2,494,657	391,738	9,888,381
<i>STONE</i>							
1940.....	482	560	12,127,271	2,886	2,779,703	1,204,375	6,194,584
1941.....	457	539	11,162,036	2,753	2,896,100	1,283,183	6,717,501
1942.....	412	490	10,988,011	2,697	3,454,263	1,517,169	7,229,425
1943.....	407	453	10,954,939	2,473	3,529,755	1,533,627	6,430,552
1944.....	405	466	.....	2,164	3,154,689	1,497,880	5,661,297
<i>TOTAL OTHER STRUCTURAL MATERIALS</i>							
1940.....	1,993	6,219	71,061,788	9,143	9,043,725	7,388,150	29,971,252
1941.....	1,904	6,004	71,192,065	8,350	9,074,128	8,998,567	30,059,153
1942.....	1,878	5,763	71,329,518	7,101	9,230,675	10,207,365	29,703,885
1943.....	1,838	5,560	69,676,023	6,900	9,775,623	9,394,633	27,118,267
1944.....	1,987	5,897	.....	5,959	9,318,547	9,700,553	27,457,267
<i>Total Clay Products and Other Structural Materials</i>							
1940.....	2,132	6,362	88,208,231	11,700	11,718,976	8,810,378	34,893,571
1941.....	2,041	6,146	88,569,618	11,231	12,301,913	10,767,140	35,865,916
1942.....	1,997	5,856	89,123,449	9,624	12,303,686	11,658,604	35,331,369
1943.....	1,939	5,665	86,838,770	9,073	12,685,464	10,656,440	32,464,633
1944.....	2,093	6,007	.....	8,206	12,495,351	11,219,057	32,916,190
<i>GRAND TOTAL OF ALL INDUSTRIES</i>							
1940.....	4,111	13,665	976,348,028	103,886	164,489,686	302,263,316	*448,080,729
1941.....	3,813	13,234	1,082,669,355	113,227	186,423,186	368,388,709	497,904,632
1942.....	3,576	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,951
1943.....	3,289	12,449	1,183,442,427	112,140	207,575,955	498,885,557	475,529,364
1944.....	3,504	12,952	.....	104,878	204,808,314	443,334,744	454,022,468

NOTE.—The net value as given in column 8 represents the gross value as given by the operator less the cost of items indicated in column 7. (a) Not reported in 1944.

* Revised data.

(c) See note above.

Table 24.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1940-1944

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material) (a) \$	Number of employees	Salaries and wages \$	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (c) \$	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*) \$
NOVA SCOTIA						
1940.....	666	48,086,422	14,934	19,285,662	6,041,154	26,189,233
1941.....	622	48,356,346	15,246	21,388,809	6,684,110	24,535,707
1942.....	694	49,486,020	14,394	22,169,053	6,594,557	25,174,960
1943.....	712	51,261,925	13,852	25,348,097	6,737,166	21,979,202
1944.....	509	.....	13,538	30,815,335	7,664,988	25,208,621
NEW BRUNSWICK						
1940.....	423	4,522,307	2,240	1,939,160	376,192	3,024,317
1941.....	428	4,429,485	2,262	2,097,842	421,785	3,231,658
1942.....	433	4,401,029	1,718	1,855,798	404,750	3,176,007
1943.....	433	4,320,846	1,570	1,828,019	396,622	3,249,933
1944.....	429	.....	1,631	2,240,478	463,353	3,631,871
QUEBEC						
1940.....	3,857	213,363,729	21,726	29,025,418	93,034,012	⊕ 100,134,979
1941.....	3,780	298,678,687	23,149	34,008,021	127,618,884	127,649,905
1942.....	3,442	329,023,834	27,235	42,901,445	169,770,830	138,100,940
1943.....	3,332	368,560,300	31,491	52,859,348	234,019,383	134,500,359
1944.....	3,747	.....	27,973	49,498,836	191,719,356	145,964,861
ONTARIO						
1940.....	6,406	405,063,185	38,774	66,395,845	135,879,424	209,277,055
1941.....	6,196	408,374,770	40,496	74,902,555	154,713,109	219,459,986
1942.....	6,324	438,130,467	36,866	72,868,161	168,749,548	212,351,819
1943.....	6,128	426,410,248	33,516	67,732,244	177,688,655	183,488,086
1944.....	6,242	.....	33,194	64,766,975	176,635,812	161,819,719
MANITOBA						
1940.....	136	39,640,423	3,145	5,107,054	16,016,832	14,065,270
1941.....	185	41,780,442	3,101	5,312,075	18,966,154	11,898,109
1942.....	173	33,172,231	2,512	4,600,171	12,476,881	9,508,569
1943.....	150	29,033,717	1,777	3,497,951	9,429,404	8,973,959
1944.....	145	.....	1,732	3,369,320	9,697,444	10,288,654
SASKATCHEWAN						
1940.....	252	17,008,171	1,961	2,573,878	7,033,060	8,652,006
1941.....	249	22,851,100	1,977	3,105,629	12,689,122	9,336,756
1942.....	219	34,755,279	2,450	4,401,131	22,710,389	14,487,408
1943.....	206	47,167,799	3,067	5,737,896	24,468,836	23,507,079
1944.....	195	.....	2,652	5,328,535	21,184,997	18,362,133

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

* See footnote, preceding table.

(a) Not reported in 1944.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) See footnote, preceding table.

⊕ Revised data.

Table 24.—Principal Statistics of the Mineral Industry in Canada, by Provinces, 1940-1944—Concluded

1	2	3	4	5	6	7
Year	Number of operating mines, oil and gas wells, quarries gravel pits, etc.	Capital employed (excluding ore reserves or other unmined material)	Number of employees	Salaries and wages	Cost of process supplies, purchased electricity and fuel also freight and smelter charges (b) (c)	Net value of bullion, ore, concentrates, residues and other minerals shipped from the mines, smelters, brick and cement plants and quarries (*)
		\$		\$	\$	\$
ALBERTA						
1940.....	729	120,234,760	10,628	14,535,789	3,832,268	29,593,293
1941.....	742	129,681,543	11,141	17,065,351	3,612,114	36,167,469
1942.....	723	126,642,796	11,446	19,628,105	4,736,312	40,604,704
1943.....	795	128,657,659	12,316	21,825,643	4,982,748	41,767,222
1944.....	882	.....	11,582	23,389,050	5,674,431	42,672,706
BRITISH COLUMBIA						
1940.....	1,169	115,249,764	14,420	23,227,719	38,730,717	52,513,427
1941.....	1,008	114,213,762	14,801	25,797,418	42,582,946	60,323,299
1942.....	845	110,267,057	14,323	27,166,996	45,101,414	64,378,171
1943.....	654	107,674,852	13,399	25,703,433	40,092,618	54,105,996
1944.....	724	.....	11,871	23,118,465	30,058,974	43,986,511
NORTHWEST TERRITORIES						
1940.....	16	3,037,930	441	880,414	623,965	(a) 1,539,206
1941.....	12	4,267,299	553	1,174,903	565,197	2,355,624
1942.....	29	8,888,280	701	1,737,398	951,183	3,017,569
1943.....	31	8,391,343	800	1,999,661	364,802	2,305,032
1944.....	71	.....	566	1,798,896	213,041	1,219,472
YUKON						
1940.....	11	10,141,337	617	1,518,747	695,692	3,091,943
1941.....	12	10,035,921	501	1,570,683	535,279	2,946,119
1942.....	15	10,578,920	398	1,221,952	415,582	3,309,804
1943.....	8	11,963,738	352	1,043,663	705,323	1,652,496
1944.....	8	.....	139	482,424	72,348	867,920
Canada						
1910.....	13,665	976,348,028	108,886	164,489,686	302,263,316	⊕ 448,080,729
1911.....	13,234	1,082,669,355	113,227	186,423,186	368,388,700	497,904,632
1912.....	12,897	1,145,345,913	112,043	198,550,260	431,911,446	514,109,951
1913.....	12,449	1,183,442,427	112,140	207,575,955	498,885,557	475,529,364
1914.....	12,952	.....	104,878	204,808,314	443,384,744	454,022,468

Plants in the provinces do not add to Canada total, owing to the fact that a plant located on the Manitoba-Saskatchewan boundary is counted but once.

* See footnote, preceding table.

(a) The value of Pitchblende refinery products is credited to the non-ferrous smelting and refining industry in Ontario and data relating to Pitchblende mining operations are included with Yukon. The value of Pitchblende refinery products are not included in 1943 or 1944.

(b) Includes fuel and electricity used for metallurgical purposes.

(c) See footnote, preceding table.

⊕ Revised data.

TREND IN EMPLOYMENT, 1944

(Employment and Payroll Statistics Branch—D.B.S.)

GENERAL SUMMARY

Further curtailment of employment was noted during 1944 in the mining industries, in which the index in each month was lower than had been the case in either 1943 or 1942. The annual average fell from 158.5 in the preceding 12 months to 154.5 in the year under review, when the variations were generally on the smaller scale. A combined working force of 72,427 was reported in 1944 by the 484 mining operators furnishing data, who disbursed a weekly average of \$2,755,156 in salaries and wages. This represents \$38.05 per employee. In 1943, the 457 co-operating employers had indicated a staff of 74,070, whose weekly payrolls had averaged \$2,672,498; the per capita figure had then been \$36.09, while that in 1942 was \$34.81. The annual index of payrolls was 105.3 in the year under review, compared with 102.7 in 1943. Thus a decline of 2.5 per cent in employment was accompanied by a rise of 2.5 per cent in the payrolls.

Coal Mining.—Employment in coal mining on the whole was in rather greater volume than in 1943 or any other year since 1930. Statistics were received from 134 operators whose employees averaged 26,788; the annual index of employment was 97.3. In 1943, 115 employers had indicated a working force of 25,614, while the annual index was 93.2.

The reported payrolls in the year under review amounted to \$989,370 per week, a per capita figure of \$36.95. In 1943, the typical worker in recorded employment in coal mining had averaged \$33.18 per week, while the 1942 mean had been \$31.09. The latest annual index of payrolls was 154.3, substantially exceeding the 1943 average of 134.5.

Metallic Ores.—Continued curtailment of activity was noted in metallic ore mining, particularly gold mining; the 1944 index, at 274.1, was lower than in 1943, or, indeed, than in any earlier year since 1936. At the 1941 all-time high, the mean had been 366.2, while that in 1943 was 303.3. Information tabulated from 224 employers showed a personnel of 34,693, varying from 32,329 at October 1 to 36,512 at the beginning of April. The salaries and wages disbursed by the firms making returns averaged \$1,411,020, a per capita of \$40.68; in the year before, the payrolls were reported at \$1,502,469, and the average earnings as \$39.70.

Table 25.—Strikes and Lock-outs in Canada, by Industries, 1943 and 1944 (Department of Labour)

	1943					1944				
	Number of strikes and lockouts	Workers involved		Time lost		Number of strikes and lockouts	Workers involved		Time lost	
		No.	Per cent of total	Man working days	Per cent of total		No.	Per cent of total	Man working days	Per cent of total
Agriculture.....										
Logging.....	6	632	0.3	7,287	0.7	2	90	0.1	145	0.0
Fishing and trapping.....										
Mining, etc. (a).....	120	59,552	27.3	208,314	20.0	49	12,044	16.0	29,371	6.0
Coal mining.....	(111)	(59,017)	(27.0)	(204,980)	(19.7)	(46)	(11,180)	(14.9)	(28,507)	(5.8)
Manufacturing.....	222	139,656	63.9	777,661	74.7	120	53,093	70.5	401,385	81.9
Construction.....	12	785	0.4	1,920	0.2	6	427	0.6	1,212	0.2
Transportation and Public Utilities.....	24	8,712	3.9	18,958	1.8	13	7,484	10.0	45,426	9.3
Trade.....	7	202	0.1	718	0.1	3	105	0.1	334	0.1
Finance.....										
Service.....	16	8,865	4.1	26,340	2.5	6	2,047	2.7	12,266	2.5
Total.....	(b) 402	218,404	100.0	1,041,198	100.0	199	75,290	100.0	490,139	100.0

(a) Non-ferrous smelting is included with mining.

(b) This total is not the sum of the figures given above because two protest strikes in Nova Scotia involved workers in more than one industry.

Non-metallic minerals, other than coal.—Slightly greater activity was noted in the production of non-metallic minerals other than coal, according to data furnished by 126 firms, whose working forces averaged 10,946, as compared with 10,589 in 1943, when 121 employers had furnished returns. The salaries and wages reported averaged \$354,766 per week, a sum which gave an average of \$32.34 per employee. In 1943, the mean had been \$30.84. The 1944 index of employment stood at 163.8, 4.8 per cent higher than that of 156.3 in 1943; in the same comparison, there was a gain of 14.3 per cent in the index of payrolls. Asbestos mining and certain other divisions of the group continued active, but quarrying and some other branches were quieter.

Of the 199 strikes and lockouts recorded for 1944, 49 were in mining, involving 16.0 per cent of the workers in all strikes and causing a time loss in man-working days of 6.0 per cent of the total. In the coal mining industry there were 46 strikes involving 14.9 per cent of the workers in all strikes and causing 5.8 per cent of the total time loss. Strikes in coal mining during 1944 caused less idle time than in any year since 1931 with the exception of 1938. In manufacturing, a strike in April of 13,346 motor vehicle factory workers was responsible for a time loss of 228,000 days or 47 per cent of the total. During the year five strikes accounted for more than 78 per cent of the total time loss. There was only one strike in gold mining during 1944, involving a small number of workers at Hedley, B.C., and none was recorded in 1943.

Table 26.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Provinces, 1944

Province	*Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total†	Salaries	Wages	Total
	Male	Female	Male	Female		\$	\$	\$
Nova Scotia.....	518	174	12,839	7	13,538	1,592,192	29,223,143	30,815,335
New Brunswick.....	74	28	1,525	4	1,631	218,059	2,022,419	2,240,478
Quebec.....	2,796	793	24,181	203	27,973	7,585,186	41,913,650	49,498,836
Ontario.....	3,023	709	28,276	1,186	33,194	9,992,152	54,774,823	64,766,975
Manitoba.....	166	45	1,429	92	1,732	562,108	2,807,212	3,369,320
Saskatchewan.....	294	69	2,101	188	2,652	935,897	4,392,638	5,328,535
Alberta.....	1,403	286	9,664	229	11,582	3,803,877	19,585,173	23,389,050
British Columbia.....	1,350	323	9,725	473	11,871	4,284,435	18,834,030	23,118,465
Yukon.....	16	3	120	.....	139	102,934	379,490	482,424
Northwest Territories (a).....	171	90	305	.....	566	764,832	1,034,064	1,798,896
Canada.....	9,811	2,520	90,165	2,382	104,878	29,841,672	174,966,642	204,808,314

*The average number of wage-earners was obtained by adding the monthly figures for individual companies and dividing by 12 irrespective of the number of months worked, the average number of wage-earners in the industry, as in the previous years, is the sum of these individual averages.

†The data are not inclusive of all individuals or syndicates engaged exclusively in prospecting or general exploration.

(a) Pitchblende mining data not available.

Table 27.—Employees, Salaries and Wages in the Mineral Industry in Canada, by Industries, 1944

Industry	*Average number of employees				Salaries and wages			
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
METAL MINING								
Alluvial Gold Mines.....	22	5	177	7	211	114,979	483,577	598,556
Auriferous Quartz Mines.....	1,744	222	15,140	120	17,226	5,871,597	31,151,908	37,023,505
Copper-Gold-Silver Mines.....	508	114	4,332	221	5,175	1,761,844	8,948,227	10,710,071
Silver-Cobalt Mines.....	20	4	140	1	165	43,960	216,615	260,575
Silver-Lead-Zinc Mines.....	318	56	2,336	59	2,769	920,827	4,889,463	5,810,290
Nickel-Copper Mines.....	445	50	6,977	156	7,628	1,431,118	13,247,577	14,678,695
Miscellaneous Metal Mines.....	198	39	1,094	54	1,385	485,401	2,323,612	2,809,013
Non-ferrous Smelting and Refining.....	2,445	926	19,550	1,006	23,927	7,816,181	36,720,810	44,536,991
NON-METAL MINING, INCLUDING FUELS								
Coal.....	1,443	268	23,861	24	25,596	4,094,605	50,925,932	55,020,537
Natural gas.....	766	222	808	14	1,810	1,744,513	1,141,141	2,885,654
Petroleum.....	641	238	1,646	22	2,547	2,050,411	3,764,265	5,814,676
OTHER NON-METALLIC MINING								
Asbestos.....	267	87	3,660	36	4,050	805,330	5,595,855	6,401,185
Feldspar and Quartz (a)...	54	6	464	5	529	98,260	674,125	772,385
Gypsum.....	30	6	291	1	328	81,745	409,127	490,872
Iron Oxides.....	4	4	47	.....	55	11,416	38,460	49,876
Mica.....	16	6	206	172	400	39,587	320,210	359,797
Peat (b).....	55	18	961	149	1,183	145,653	1,008,356	1,154,009
Salt.....	87	59	504	60	710	397,113	905,030	1,302,143
Talc and Soapstone.....	11	3	99	.....	113	29,532	104,351	133,883
Miscellaneous.....	99	17	744	5	865	240,499	1,259,751	1,500,250
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS								
Cement.....	76	16	1,066	49	1,207	229,490	2,025,285	2,254,775
Clay Products.....	195	58	1,786	208	2,247	594,282	2,582,522	3,176,804
Lime.....	80	22	713	.....	815	178,802	1,235,624	1,414,426
Sand and Gravel.....	89	17	1,662	5	1,773	213,270	2,281,387	2,494,657
Stone.....	198	57	1,901	8	2,164	441,257	2,713,432	3,154,689
Total.....	9,811	2,520	90,165	2,382	104,878	29,841,672	174,966,642	204,808,314

*See footnote, preceding table.

(a) Includes nepheline-syenite mines.

(b) Includes fuel, moss and humus.

Table 28.—The Number of Wage-Earners in the Canadian Mining Industry, 1944, who Worked the Number of Hours Specified, during One Week in Month of Highest Employment

	30 hours or less	31-43 hours	44 hours	45-47 hours	48 hours	49-50 hours	51-54 hours	55 hours	56-64 hours	65 hours and over	Grand total	Total wages paid in that week*
By provinces—												\$
Nova Scotia.....	329	2,172	117	302	11,751	152	321	74	1,066	195	16,479	637,774
New Brunswick.....	60	160	38	39	2,307	48	242	5	144	25	3,068	70,083
Quebec.....	985	2,160	480	553	18,811	825	1,604	350	3,444	874	30,086	976,117
Ontario.....	856	1,602	249	1,498	20,549	654	1,091	370	4,053	1,014	31,936	1,235,080
Manitoba.....	64	111	65	65	1,748	106	99	9	220	16	2,515	81,790
Saskatchewan.....	197	399	34	194	1,454	212	178	26	141	105	2,940	106,129
Alberta.....	490	985	389	205	8,009	268	764	36	562	308	12,016	514,493
British Columbia.....	889	1,893	1,262	167	6,995	85	329	77	969	72	12,738	475,071
Yukon.....	2	4	.....	3	.....	2	19	5	107	19	161	10,955
Northwest Territories (b).....	4	18	.....	1	305	1	11	.....	25	3	318	25,236
Canada Total, Male.....	3,690	9,074	2,365	2,906	70,352	2,331	4,548	946	10,578	2,616	109,316	4,066,067
Canada Total, Female.....	276	430	272	121	1,577	22	110	6	162	15	2,991	67,561
Canada Total.....	3,876	9,504	2,637	3,027	71,929	2,353	4,658	952	10,740	2,631	112,307	4,133,628
METAL MINING												
Alluvial Gold Mines.....	2	11	1	3	53	2	19	5	128	21	245	13,859
Auriferous Quartz Mines.....	497	1,442	120	250	9,648	256	897	60	2,900	609	16,680	671,736
Copper-Gold-Silver Mines.....	270	553	59	168	3,105	267	452	33	329	68	5,334	205,128
Silver-Cobalt Mines.....	5	44	3	3	83	8	20	1	27	10	204	6,499
Silver-Lead-Zinc Mines.....	59	94	22	10	1,982	29	103	62	341	48	2,750	109,400
Nickel-Copper Mines.....	38	139	5	20	7,455	24	41	2	98	2	7,824	348,785
Miscellaneous Metal Mines.....	43	106	12	17	669	20	138	12	694	90	1,801	79,178
Non-Ferrous Smelting and Re- fining.....	574	1,456	224	1,392	17,391	374	452	78	1,428	119	23,488	787,017
Total, Male.....	1,406	3,702	406	1,821	39,250	967	2,106	259	5,825	963	56,696	2,177,967
Total, Female.....	82	174	40	42	1,136	13	16	3	120	4	1,630	43,635
Total.....	1,488	3,876	446	1,863	40,386	980	2,122	253	5,945	967	58,326	2,221,602
NON-METAL MINING, INCLUDING FUELS												
Coal.....	1,068	3,673	686	501	20,307	292	673	73	1,323	387	29,183	1,204,447
Natural gas.....	157	51	109	25	292	33	170	6	162	53	1,058	29,178
Petroleum.....	109	135	19	11	1,183	108	114	2	246	27	1,954	87,771
Total, Male.....	1,319	4,652	809	532	21,744	432	953	81	1,721	466	32,110	1,318,973
Total, Female.....	15	7	5	4	38	1	4	.....	10	1	85	2,423
Total.....	1,334	4,659	814	537	21,782	433	957	81	1,731	467	32,195	1,321,396
OTHER NON-METAL MINING												
Asbestos.....	30	353	38	98	3,016	71	52	3	133	53	3,847	115,867
Feldspar and Quartz.....	41	50	13	29	145	54	55	36	171	57	651	19,780
Gypsum.....	43	34	12	17	81	24	60	36	45	50	402	11,124
Iron Oxides.....	.....	.....	.....	.....	35	.....	.....	17	.....	.....	52	1,277
Mica.....	21	88	68	39	120	53	46	11	32	6	484	8,484
Peat (a).....	480	395	734	81	230	168	233	44	132	69	2,566	53,484
Salt.....	42	61	14	43	156	56	56	18	103	46	595	21,386
Talc and Soapstone.....	4	9	3	8	2	6	23	3	42	17	117	2,377
Miscellaneous.....	60	85	16	27	194	43	87	58	215	177	962	30,457
Total, Male.....	551	847	673	269	3,822	467	555	224	855	466	8,729	248,151
Total, Female.....	170	228	225	73	157	8	57	2	18	9	947	16,085
Total.....	721	1,075	898	342	3,979	475	612	226	873	475	9,676	264,236
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS												
Cement.....	29	86	71	41	622	44	79	76	101	31	1,270	42,707
Clay Products.....	81	67	134	89	462	243	410	129	513	216	2,344	68,371
Lime.....	28	46	53	21	140	28	114	13	281	108	832	27,984
Sand and Gravel.....	30	61	55	35	4,237	31	53	30	247	187	4,966	101,895
Stone.....	165	234	166	99	321	119	311	144	959	180	2,698	85,437
Total, Male.....	324	473	477	283	5,536	465	934	391	2,177	721	11,781	329,976
Total, Female.....	9	21	2	2	246	.....	33	1	14	1	329	5,418
Total.....	333	494	479	285	5,782	465	967	392	2,191	722	12,110	326,394

*Includes the actual money wages paid, the value of room and board, where provided, deductions from employees for income tax and social services, such as sickness, accident, insurance, pensions, etc., as well as any other allowance forming part of the employees' wages, includes overtime.

(a) In all forms.

(b) Exclusive of Pitchblende mining.

Table 29.—Employees and Salaries and Wages Paid in Canadian Mining Industry, 1930-1944

Year	Nova Scotia		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	15,484	19,284,197	1,391	1,132,306	15,397	15,190,714	24,706	34,433,915	3,021	4,372,044	1,371	1,040,790
1931.....	14,871	15,302,444	1,197	1,048,860	11,141	12,666,586	20,277	30,470,475	2,059	3,096,332	1,092	896,131
1932.....	13,706	11,302,801	1,480	1,123,080	7,694	8,198,379	16,376	24,412,126	1,730	2,106,017	924	748,782
1933.....	13,915	9,852,765	1,629	1,402,114	8,629	8,621,984	17,306	25,600,168	1,379	1,847,251	1,265	1,111,001
1934.....	13,500	13,594,114	1,722	1,276,770	10,362	10,492,169	22,033	32,619,846	1,948	2,796,454	1,461	1,257,282
1935.....	14,550	14,301,510	2,390	1,865,407	11,811	12,794,600	25,264	38,152,140	2,346	3,403,649	1,457	1,343,041
1936.....	15,368	15,980,687	1,744	1,248,431	14,225	15,774,362	31,105	46,899,805	2,932	3,752,367	1,828	1,937,825
1937.....	15,629	18,373,958	3,012	1,509,063	19,121	22,708,131	36,238	58,891,339	3,159	4,301,366	2,307	2,372,443
1938.....	15,591	15,959,095	3,042	2,074,273	20,829	24,485,254	35,791	58,926,900	2,840	4,393,270	2,287	2,470,530
1939.....	15,202	17,371,518	3,263	2,311,835	20,872	25,689,382	37,233	63,220,042	3,027	4,541,992	2,026	2,347,264
1940.....	14,934	19,285,662	2,240	1,939,160	21,726	29,025,418	38,774	66,395,845	3,145	5,107,054	1,961	2,573,878
1941.....	15,246	21,388,809	2,262	2,097,842	23,149	34,008,021	40,496	74,902,555	3,101	5,312,075	1,977	3,105,529
1942.....	14,394	22,169,053	1,718	1,855,798	27,235	42,901,445	36,866	72,868,161	2,512	4,600,171	2,450	4,401,181
1943.....	13,852	5,348,097	1,570	1,828,019	31,491	52,859,348	33,516	67,732,244	1,777	3,497,951	3,067	5,737,896
1944.....	13,538	30,815,335	1,631	2,240,478	27,973	49,498,836	33,194	64,766,975	1,732	3,369,320	2,652	5,328,535

Year	Alberta		British Columbia		Yukon		Northwest Territories (a)		Canada	
	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
1930.....	12,675	16,272,916	14,836	21,412,925	319	835,525			89,200	113,975,332
1931.....	10,579	11,357,722	11,297	16,345,887	296	784,862			72,809	91,969,299
1932.....	9,692	10,476,449	9,565	12,612,151	286	761,585	17	30,679	61,470	71,772,049
1933.....	9,057	9,463,382	9,845	11,455,946	233	545,692	76	131,502	63,334	70,031,805
1934.....	9,843	9,792,297	12,270	15,482,102	286	660,814	80	154,338	73,505	88,126,186
1935.....	9,706	10,862,198	12,352	16,479,606	333	809,067	47	69,341	80,256	100,080,559
1936.....	10,376	11,850,463	12,827	17,908,553	566	1,372,917	28	40,812	90,999	116,766,222
1937.....	10,843	12,924,934	14,282	21,487,277	691	1,502,692	132	221,181	105,414	144,292,384
1938.....	10,612	12,811,975	15,179	21,975,143	794	1,962,941	310	584,619	107,275	145,644,000
1939.....	10,548	13,097,818	14,587	21,698,690	728	1,605,671	273	468,996	107,759	152,353,208
1940.....	10,628	14,535,789	14,420	23,227,719	617	1,518,747	441	880,414	108,886	164,489,686
1941.....	11,141	17,065,351	14,801	25,797,418	501	1,570,683	553	1,174,903	113,227	186,423,186
1942.....	11,435	19,628,105	14,323	27,166,996	398	1,221,952	701	1,737,398	112,032	198,550,260
1943.....	12,316	21,825,643	13,399	25,703,433	352	1,043,663	800	1,999,661	112,140	207,575,955
1944.....	11,582	23,389,050	11,871	23,118,465	139	482,424	566	1,798,896	104,878	204,808,314

(a) Data relating to mining of Pitchblende ores included with Yukon until 1943; these data not available for 1944.

Table 30.—Wage-earners on Surface, Underground and in Mill, 1944

Province	Metal Mines			Fuels			Other†		
	Surface (a)	Under- ground	Mill	Surface	Under- ground	Mill	Surface	Under- ground	Mill
Nova Scotia.....	22	38	5	1,911	10,188	.....	378	30	274
New Brunswick.....	.....	.....	.....	307	619	.....	465	13	125
Quebec.....	1,920	3,966	10,746	.....	.....	.....	3,706	573	3,473
Ontario.....	5,175	11,515	8,872	710	.....	.....	1,788	148	1,254
Manitoba.....	327	495	177	.....	.....	.....	309	17	196
Saskatchewan.....	550	410	537	263	338	.....	59	.....	132
Alberta.....	.....	.....	.....	3,570	5,577	.....	158	.....	588
British Columbia.....	1,097	1,933	3,402	743	1,907	.....	852	1	263
Yukon.....	5	.....	115	.....	.....	.....	.....	.....	.....
Northwest Territories(b)	33	23	7	242	.....	.....	.....	.....	.....
Total, 1944.....	9,129	18,380	23,861	7,746	18,629	.....	7,715	782	6,305
Total, 1943.....	9,641	20,497	26,974	8,560	18,953	.....	8,332	783	6,297
Total, 1942.....	28,724	24,780	3,969	7,932	19,227	.....	11,743	938	3,427
Total, 1941.....	25,940	28,388	4,198	7,902	19,608	.....	12,915	923	3,208
Total, 1940.....	23,525	27,575	3,833	8,040	19,859	.....	12,979	775	2,958
Total, 1939.....	23,018	26,530	3,750	8,037	19,861	.....	11,406	857	5,766
Total, 1938.....	23,326	24,754	3,713	8,277	20,260	.....	15,808	678	1,894

†Includes asbestos, salt, gypsum, stone quarries, brick plants, etc., etc.

(a) Including non-ferrous smelters and refineries until 1942; in 1943 and 1944 employees in these plants shown under mill.

(b) Exclusive of data on mining of Pitchblende ores.

Table 31.—Fuel and Electricity Used for All Purposes in the

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian	Imported	From United States	From other countries					
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.	lb.
METAL MINING									
Alluvial Gold.....	Quantity	10				1	22,738	389	
	\$	776				112	13,376	304	
Auriferous Quartz.....	Quantity	6,574	44,227	1,279	40	252	246,491	12,200	294
	\$	75,938	522,905	18,205	1,187	1,764	88,536	3,066	9
Copper-Gold-Silver.....	Quantity	9,494	997	61		66,680	93,574	6,089	8,889
	\$	90,950	13,170	1,110		280,991	32,159	1,441	200
Silver-Cobalt.....	Quantity	553	357	75			2,615	21	
	\$	8,903	3,934	1,301			993	6	
Silver-Lead-Zinc.....	Quantity	42,236	2,143			37	53,110	1,637	
	\$	231,366	24,847	54		601	17,736	501	
Nickel-Copper.....	Quantity	2,296	20,996	127		40	62,246	3,176	
	\$	18,893	177,574	1,890		520	14,809	667	
Miscellaneous Metals.....	Quantity		2,611	34		70	152,840	10,420	
	\$		30,070	661		1,400	96,512	2,142	
Non-Ferrous Smelting and Refining.....	Quantity	344,619	718,285	180			307,403	48,362	1,595,857
	\$	3,210,138	6,034,504	2,269			96,289	9,267	27,457
Total.....	Quantity	405,782	789,616	1,737	106	67,002	941,017	82,294	1,605,040
	\$	3,636,964	6,807,004	25,490	1,877	284,155	4,311,637	321,008	27,666
NON-METAL MINING									
<i>Fuels</i>									
Coal.....	Quantity	531,791			53,269		169,516	3,569	
	\$	1,838,765			66,055		48,842	1,199	
Natural Gas.....	Quantity	60	38	20			58,587		
	\$	653	529	260			17,050		
Petroleum.....	Quantity	2,665		4		1	276,180	1,871	
	\$	22,884		57		15	74,515	254	
Total.....	Quantity	534,516	38	24	53,269	1	504,283	5,440	
	\$	1,862,302	529	317	66,055	15	140,407	1,455	
<i>Other Non-Metal Mining</i>									
Asbestos.....	Quantity	139	32,271	17,689			119,502	1,797	
	\$	1,474	322,672	160,610			37,389	344	
Feldspar, nepheline	Quantity	34	6,174	11		1	135,892	2,552	
syenite and quartz.	\$	386	54,571	188		10	43,444	415	
Gypsum.....	Quantity	8,284	1,659				61,632	652	
	\$	69,729	12,689				15,136	130	
Iron Oxides.....	Quantity		1,208	15			1,325	50	
	\$		13,288	206			412	10	
Mica.....	Quantity	29	172	36			33,179	2,880	
	\$	314	2,074	516			9,459	915	
Peat.....	Quantity	714	18				94,863	4	
	\$	6,580	163				24,647	1	
Salt.....	Quantity	9,945	68,753		23,473		8,266	257	
	\$	67,268	471,995		88,987		2,403	69	
Talc and Soapstone.....	Quantity						8,434	140	
	\$						2,762	27	
Miscellaneous.....	Quantity	13,511	30,531	20	21,334	7	128,206	814	
	\$	70,231	281,254	336	65,667	86	31,934	164	
Total.....	Quantity	32,656	140,786	17,771	44,808	72	591,299	9,146	
	\$	215,982	1,158,706	161,856	154,664	1,095	167,586	2,075	
STRUCTURAL MATERIALS AND CLAY PRODUCTS									
Cement.....	Quantity	108,292	219,802				136,170	6,949	
	\$	731,706	1,634,690				36,893	1,304	
Clay Products.....	Quantity	26,042	80,998	390	2,116	560	111,685	2,325	
	\$	217,702	767,449	3,808	8,991	6,490	32,647	422	
Lime.....	Quantity	21,472	87,824	11,966	8,582	347	18,425	111,758	349
	\$	205,714	640,752	111,270	86,293	2,686	207,286	32,740	88
Sand and Gravel.....	Quantity	4,188	14,302	251			404,714	1,872	
	\$	34,039	104,334	2,566			119,535	329	
Stone.....	Quantity	4,980	9,096	55	4		70,493	5,944	
	\$	42,515	81,553	863	60		219,143	993	
Total.....	Quantity	164,974	412,082	12,662	8,600	2,463	1,474,820	17,439	
	\$	1,231,676	3,228,778	118,507	86,552	11,677	430,958	3,136	
Grand Total.....	Quantity	1,137,928	1,342,522	32,194	8,706	167,542	3,511,419	114,319	1,605,040
	\$	6,946,924	11,195,017	306,170	88,429	516,551	4,527,713	24,058	27,666

(a) On outgoing shipments only.

(b) Paid by mine operator only.

(c) Value of 54,613,700 cu. ft. compressed air.

(d) Exclusive cost of ores treated.

Mineral Industry in Canada, by Kinds and Industries, 1944

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplies	Freight (a)	Treatment charges (b)
		Manufactured	Natural								
Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
31,870	1,074						12,958,500	5,498,700			
15,087	13,920			16		43,591		26,488	13,703	16,927	9,883
1,799,804	35,362				709,437,980		28,320,882	172,720			
278,647	234,507			1,688	4,668,292	5,895,117		5,182	11,174,746	373,074	1,586,095
689,219	673				262,411,942		79,749,693	6,493,151			
95,526	5,140				876,809	1,492,243		46,799	5,170,581	720,920	16,898,032
7,406	107				1,641,789						
1,068	759			(c)14,149	16,520	48,323			35,809	3,138	12,330
483,987	1,170				83,025,582		22,534,783				
85,053	6,239				493,834	860,231			1,752,087	1,070,103	806,777
1,226,686	271				166,328,143		10,720				
129,494	1,897				544,174	889,918			8,040,700	18,427	99,681
1,064,689	10,289				741,712,764		2,311,490				
191,596	113,967				457,871	951,929			657,430	389,554	58,937
46,281,332	2,065	8,648	519		10,428,158,985		257,757,492	5,855,077			
3,244,852	22,807	7,805	387		20,043,076	36,907,623		25,748	32,730,138		
									(d)		
51,584,993	51,011	8,648	519		12,592,717,185		403,643,560	18,019,648			
4,041,323	399,236	7,805	387	15,853	27,100,576	46,998,975		104,217	59,575,194	2,592,143	19,471,735
111,675	25				165,998,397		53,677,006	9,352,570			
19,653	106			147	2,091,553	4,066,320		133,229	8,646,500		
507			1,035,060		22,482						
61			168,390		1,060	188,003			13,149		
423,709	749		7,631,540		1,800,260						
23,383	2,731		839,475	7,045	30,125	1,009,484			242,311		
535,891	774		8,666,800		167,821,139		53,677,006	9,352,570			
43,097	2,837		1,007,865	7,192	2,122,738	6,254,807		133,229	8,901,960		
85,032	15				144,189,107						
16,335	71				1,096,934	1,635,829			1,166,909		
283,199	792				3,311,024		2,326,433				
33,761	4,988				28,340	166,501			241,400	54,393	
41,221	25		7,776		3,863,316		1,554,806				
4,737	150		2,956		43,192	148,743			239,198		
605	267				221,648						
73	1,862				3,222	19,115			6,700	11,670	
1,410	886				289,200						
235	3,553				5,975	23,586			33,038		
8,059	68				868,315		880				
1,246	646				15,140	48,423			46,527		
486			78		3,729,678		7,853,875				
52			42		21,310	652,126			134,235		
19,445	75				1,841,340		167,850				
2,985	510				21,358	27,642			40,523		
1,813,508	3,737	217,314			9,578,007		6,497,349				
107,531	23,336	32,032			94,358	706,929			462,999		
2,265,952	5,865	217,814	7,854		167,891,635		18,401,193				
166,965	35,116	32,032	2,998		1,329,829	3,428,894			2,371,529	66,063	
51,392	48				137,259,162		394,218				
6,249	348				786,765	3,197,955			1,541,063		
156,349	17,335	23,924	1,409,415		13,417,619		258,166				
13,917	100,646	5,744	20,585	2,286	176,427	1,357,313			161,189		
1,555,615	45,417				13,336,125		2,042,217				
90,752	289,634			493	85,015	1,752,723			168,886		
120,765			62		5,164,909						
11,762			37		60,657	333,259			58,479		
381,886	1,439		2,200		19,522,228		443,650				
47,334	7,098		1,596		278,711	671,056			826,824		
2,266,007	61,239	23,924	1,411,677		188,700,043		3,738,251				
170,014	397,726	5,744	22,218	2,779	1,387,675	7,312,306			2,756,441		
56,639,856	121,889	249,886	10,086,650		12,917,130,092		479,460,010	27,372,218			
4,421,389	834,915	45,581	1,033,468	25,824	31,940,718	62,994,982		237,446	73,603,124	2,658,206	19,471,735

Table 32.—Fuel and Electricity Used for All Purposes

Industry	Bituminous		Anthracite coal		Lignite coal	Coke	Gasoline	Kerosene	Charcoal
	Canadian Imported		From United States	From other countries					
	Tons	Tons	Tons	Tons	Tons	Tons	Imp. gal.	Imp. gal.	lb.
METAL MINING									
Nova Scotia.....	Quantity	358,321				1,143	132,996	838	
	\$	1,453,087				9,250	32,734	185	
New Brunswick.....	Quantity	20,440	3			2	71,795	341	
	\$	143,874	63			18	17,749	68	
Quebec.....	Quantity	181,545	373,337	29,512	8,600	5,298	1,111,069	61,245	48,550
	\$	2,075,336	3,410,206	272,634	86,552	71,868	358,902	11,358	904
Ontario.....	Quantity	12,614	969,077	2,674	66	2	319,084	31,325	1,542,584
	\$	116,545	7,782,522	33,136	690	19	3,813,681	351,785	6,985
Manitoba.....	Quantity	57,848	12			23,820	550	68,037	985
	\$	519,140	260			91,673	7,261	23,865	260
Saskatchewan.....	Quantity	70,007	63			51,640	191	115,601	4,461
	\$	601,072	1,366			101,860	2,775	36,788	1,125
Alberta.....	Quantity	192,348				25,078		370,787	4,414
	\$	603,455				38,844		98,499	1,200
British Columbia.....	Quantity	244,791	30	8	40	67,002	58,397	437,093	10,092
	\$	1,453,355	600	400	1,187	284,155	622,748	127,150	2,453
Yukon.....	Quantity	10					1	18,371	357
	\$	776					112	10,698	291
Northwest Territories...	Quantity	4						4,857	261
	\$	284						2,389	133
Canada.....	Quantity	1,137,928	1,342,522	32,194	8,706	167,542	384,666	3,511,419	114,319
	\$	6,946,924	11,195,017	306,170	88,429	516,551	4,527,713	1,060,559	24,058
									1,605,040
									27,666

(a) On outgoing shipments only.
(b) Paid by mine operator only.

Table 33.—Fuel and Electricity Used Only for Metallurgical

Province	Bituminous coal		Anthracite coal		Lignite coal	Coke	Charcoal
	Candian	Imported	From United States	From Other Countries			
	Tons	Tons	Tons	Tons	Tons	Tons	lb.
Quebec.....	Quantity	152,842	112,569			4,908	48,550
	\$	1,793,777	1,100,353			66,977	904
Ontario.....	Quantity		568,384	103		277,450	1,542,290
	\$		4,629,117	1,420		3,516,626	26,285
Manitoba.....	Quantity	10,038					
	\$	95,094					
Saskatchewan.....	Quantity	52,702					
	\$	499,243					
British Columbia.....	Quantity	92,602				57,794	5,017
	\$	606,180				615,809	268
Canada.....	Quantity	308,184	680,953	103		340,152	1,595,837
	\$	2,994,294	5,729,470	1,420		4,199,412	27,457

*All used in the non-ferrous smelting and refining industry and included in table 32.

in the Mineral Industry in Canada, by Provinces, 1944

Fuel oil and diesel oil	Wood	Gas		Other fuel	Electricity purchased	Total	Electricity generated for own use	Electricity generated for sale	Process supplies	Freight (a)	Treatment charges (b)
		Manu- factured	Natural								
Imp. gal.	Cords	Mc cu. ft.	Mc cu. ft.	\$	K.W.H.	\$	K.W.H.	K.W.H.	\$	\$	\$
51,433	449	217,314			115,099,163		24,581,212	5,546,578			
5,520	1,718	32,032			1,254,046	2,788,572		67,019	4,833,915	352	2,138
19,989	10,873		34,348		2,512,401		1,554,806				
2,301	66,124		13,757	493	52,348	296,795			143,920		
29,196,407	43,192	8,648			9,261,816,867		288,170,695	5,259,000			
2,198,940	299,463	7,805		645	18,729,557	27,524,170		22,614	26,461,602	825,943	11,853,667
20,994,726	27,816	23,888	208,137		2,364,390,797		27,845,678	596,077			
1,566,092	180,188	5,733	122,010	14,158	7,452,229	21,472,067		3,134	30,126,121	423,422	1,044,497
104,996	9,504	36			121,421,127		2,651,594				
15,505	59,583	11			407,601	1,125,191			1,611,396	92,115	1,345,772
1,780,113					334,059,586		3,573,676				
110,619	6,376			7	394,045	1,256,201			2,515,137		3,595,072
471,975	3,759		9,844,165		58,311,526		13,633,557	292,958			
29,967	17,689		897,701	7,185	697,301	2,391,841		22,757	3,124,867		
3,958,228	23,473				657,473,638		134,750,292	10,178,905			
470,482	178,050			2,679	2,921,050	6,044,577		95,434	4,639,293	1,295,761	1,610,254
27,580							12,698,500	5,498,700			
13,919	9,325					35,121		26,488	6,335	18,942	11,950
34,409	1,346				2,044,837						
8,044	16,399			657	32,541	60,447			142,538	1,671	8,385
56,639,856	121,889	249,886	10,086,650		12,917,130,002		479,460,010	27,372,218			
4,421,389	834,915	45,581	1,033,468	25,824	31,940,718	62,994,982		237,446	73,605,124	2,658,206	19,471,735

Purposes in the Mineral Industry of Canada, by Provinces, 1944(*)

Gasoline	Kerosene	Fuel oil and diesel oil	Wood	Gas		Other	Electricity	Total	Electricity generated own use
				Manu- factured	Natural				
Imp. gal.	Imp. gal.	Imp. gal.	Cords	M cu. ft.	M cu. ft.	\$	K.W.H.	\$	K.W.H.
23,306	7,663	27,355,659	937	8,648			8,412,793,307		239,070,624
7,686	1,552	1,943,523	13,079	7,805			14,385,600	19,321,256	
32,753	7,175	17,502,302	35		519		331,127,949		
8,733	1,467	1,132,120	276		387		1,058,153	10,374,564	
		1,872					31,126,000		
		286	421				28,181	123,932	
		9,828	316				163,414,000		
		1,505	2,211				147,949	650,908	
95,762	2,091	1,003,983	584				515,190,346		
32,559	627	120,562	5,575				1,946,689	3,328,269	
151,821	16,929	45,873,644	1,932	8,648	519		9,453,651,602		239,070,624
48,978	3,646	3,197,996	21,562	7,805	387		17,566,572	33,798,999	

Table 34.—Electricity Purchased by Canadian Mining Industry, 1935-1944

Year	Auriferous Quartz Mining (gold mines)		Total All Metal Mines (including non-ferrous smelters and refineries)		Total entire mining industry	
	K.W.H.	\$*	K.W.H.	\$*	K.W.H.	\$*
1935	464,146,582	3,722,163	2,320,385,917	9,415,062	2,591,470,745	12,546,298
1936	449,026,003	4,345,066	2,841,045,187	10,783,296	3,151,192,519	14,055,915
1937	629,083,378	5,031,691	3,368,047,901	12,442,423	3,744,919,549	16,135,702
1938	741,866,953	5,333,427	4,125,037,129	13,917,518	4,441,098,287	17,485,652
1939	777,323,223	5,803,160	4,449,477,330	13,060,673	4,817,050,497	18,749,417
1940	868,846,323	5,893,562	5,105,497,931	17,005,546	5,569,961,386	21,066,734
1941	947,563,696	6,277,626	7,105,275,873	22,373,156	7,630,138,911	26,710,350
1942	846,900,417	5,856,971	9,626,254,575	29,004,724	10,186,657,256	33,614,088
1943	738,795,434	4,947,060	12,288,710,388	32,308,193	12,834,163,470	36,971,372
1944	709,437,980	4,668,292	12,392,717,185	46,998,975	12,917,130,002	31,940,718

*Includes service charges, for previous years see annual mineral production report for 1942.

Table 35.—Power Equipment in Use and Power Equipment in
ORDINARILY IN USE

Industry	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power em- ployed	Electric motors run by primary power in same plant	Boilers
METAL MINING—										
Alluvial Gold Mines.....No. H.P.			4 127	15 271	4 15,080	23 15,478		23 15,478	32 3,888	
Auriferous Quartz Mines.....No. H.P.	5 240		31 8,052	36 3,698	13 9,257	85 21,247	8,301 226,551	8,386 247,798	830 15,527	139 11,893
Copper-Gold-Silver Mines.....No. H.P.		1 10,000	14 3,855	5 231	6 8,900	26 22,986	2,855 106,024	2,881 129,010	584 17,913	27 4,013
Silver-Cobalt Mines.....No. H.P.	1 175			1 45		2 220	38 851	40 1,071		5 140
Silver-Lead-Zinc Mines (a).....No. H.P.		3 6,000	19 3,248	8 351	5 1,070	55 10,669	947 22,670	982 33,339	471 8,362	35 2,837
Nickel-Copper Mines.....No. H.P.			2 180	1 4		3 184	953 42,987	956 43,171		4 420
Miscellaneous Metal Mines.....No. H.P.			12 2,468	17 763		29 3,231	494 18,075	523 21,306	54 1,715	9 890
Non-ferrous Smelting and Refining.....No. H.P.	20 920	12 9,470	15 3,874	22 2,008	11 51,125	80 67,397	12,148 307,159	12,228 374,556	393 6,292	51 39,270
Total.....No. H.P.	26 1,335	16 25,470	97 21,804	105 7,371	39 85,432	283 141,412	25,736 724,317	26,019 865,729	2,364 53,697	270 59,463
NON-METAL MINING, INCLUDING FUELS—										
Coal.....No. H.P.	168 51,788	11 17,762	25 1,598	239 4,855	2 12,000	445 88,093	3,112 118,886	3,557 206,889	507 22,164	221 50,336
Natural Gas.....No. H.P.	4 140	4 80		261 8,661		269 8,881	95 1,040	364 9,921	24 1,398	14 2,460
Petroleum.....No. H.P.	63 25,220	11 1,130	9 1,078	87 2,681		170 30,109	160 1,228	330 31,337	2 2	98 8,683
Total.....No. H.P.	235 77,148	26 18,972	34 2,676	587 16,197	2 12,000	884 126,993	3,367 121,154	4,251 245,147	533 23,561	333 61,479
OTHER NON-METAL MINING										
Asbestos.....No. H.P.	6 210	1 120	1 105	22 1,425		30 1,860	1,111 54,939	1,141 56,799		3 80
Feldspar, nepheline syenite and quartz.....No. H.P.	8 508		24 2,582	49 2,380		81 5,470	99 2,038	180 7,508	124 1,198	10 865
Gypsum.....No. H.P.	4 1,190		18 2,158	18 951		40 4,299	153 5,038	193 9,337	22 527	4 600
Iron Oxides.....No. H.P.							13 100	13 100		
Mica.....No. H.P.	1 50		1 75	29 963		31 1,088	9 215	40 1,303		4 135
Peat.....No. H.P.	1 30		3 225	99 3,080	2 70	105 3,405	83 1,155	188 4,560		1 15
Salt.....No. H.P.	16 1,385	14 1,840		3 27		33 3,252	172 1,080	205 4,332	231 2,307	8 3,970
Talc and Soap-stone.....No. H.P.			4 343	13 365		17 708	37 680	54 1,388	14 121	
Miscellaneous.....No. H.P.	4 65		25 3,020	27 916	2 650	58 4,651	311 5,040	369 9,691	147 1,799	17 772
Total.....No. H.P.	40 3,438	15 1,960	76 8,508	260 10,107	4 720	395 24,733	1,988 70,285	2,383 95,018	538 5,952	47 6,437

Reserve or Idle, in the Mineral Industry in Canada, by Industries, 1944

IN RESERVE OR IDLE

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
1	1	4	4	2	12		12	267	1	4
15	14	39	62	30	160		160	1,740	15	239
10	1	34	80	1	126	983	1,109	157	47	433
1,897	5	5,257	6,579	780	14,518	25,046	39,564	3,627	2,940	19,397
	3	3	2		8	192	200	36	6	102
	7,500	710	245		8,465	4,149	12,604	1,831	882	28,730
1		1	5		7	15	22		1	
20		120	124		264	516	780		65	
		3	4		7	127	134	42	3	31
		242	430		672	4,457	5,129	824	76	3,347
						70	70		2	80
						2,862	2,862		145	32,269
1		6	3		10	38	48	5	3	6
125		1,095	415		1,635	1,829	3,464	335	260	524
1	4	2	1		8	1,508	1,516	45	7	210
1,074	6,515	175	60		7,824	36,928	44,752	2,757	4,110	107,606
14	9	53	99	3	178	2,933	3,111	552	70	866
3,131	14,034	7,638	7,915	810	33,528	75,787	109,315	11,114	8,493	192,112
38	5	1	23		67	218	285	36	23	99
7,080	2,063	8	466		9,617	4,270	13,887	752	4,649	8,019
			4		4		4			4
			115		115		115			202
18		2	28		48	17	65		11	9
1,981	198		306		2,485	372	2,857		425	515
56	7	1	55		119	235	354	36	34	112
9,061	2,261	8	887		12,217	4,642	16,859	752	5,074	8,736
			7		7	39	46			4
			77		77	3,254	3,331			117
			4		4	5	9	20		17
			76		76	71	147	120		333
4		4	16		24	9	33			7
185		659	795		1,639	365	2,004			345
6			1		7	2	9			
152			3		155	30	185		40	
			4		4		4			1
		115	90		205		205			1
			1		1	10	11	18	7	2
			12		12	73	85	266	1,135	18
						5	5			
						320	320			
			3		12	24	36	32	9	4
35	165	1,285	65		1,650	633	2,183	515	530	234
11	1	12	35		59	94	153	70	17	35
372	165	2,059	1,118		3,714	4,746	8,460	901	1,705	1,048

Table 35.—Power Equipment in Use and Power Equipment in Reserve
ORDINARILY IN USE

Industry	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS—										
Cement.....No.			5	43		48	1,478	1,526	32	2
H.P.			1,176	1,300		2,476	77,304	79,780	1,193	250
Clay Products.....No.			6	55	17	118	488	606	25	53
H.P.	3,340	20	427	1,869	712	6,368	11,938	18,306	234	5,012
Lime.....No.			5	21	6	37	508	545	65	10
H.P.	190		570	695	105	1,560	7,799	9,359	843	1,664
Sand and Gravel.....No.			13	74	7	104	193	297	2	8
H.P.	577		1,243	3,107	240	5,167	6,647	11,814	45	518
Stone.....No.			69	184	58	356	747	1,103	45	37
H.P.	1,916	2	5,533	6,542	2,407	16,400	21,039	37,439	2,155	1,804
Total.....No.	95	5	95	377	88	663	3,414	4,077	169	110
H.P.	6,023	22	8,949	13,513	3,464	31,971	124,727	156,698	4,470	8,887
Grand Total 1944.....No.	396	62	305	1,329	133	2,225	34,505	36,730	3,604	760
H.P.	87,944	46,424	41,937	47,188	101,616	325,109	1,040,483	1,365,592	87,683	136,266
Grand Total 1943.....No.	479	56	369	1,219	88	2,211	34,705	36,916	3,727	819
H.P.	98,772	50,200	51,069	43,998	91,502	335,541	1,119,952	1,455,493	89,290	138,028

Table 36.—Power Equipment in Use, and Power Equipment in Reserve

Province	Ordinarily in use									
	Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers
Nova Scotia.....No.	45	8	20	39	1	113	1,035	1,148	135	92
H.P.	36,609	16,333	2,323	1,644	25	56,934	69,637	126,571	8,877	30,561
New Brunswick.....No.	14		4	59	1	78	225	303	14	18
H.P.	1,610		380	1,854	75	3,919	1,677	5,596	227	1,180
Quebec.....No.	25	11	94	296	60	486	11,180	11,666	656	133
H.P.	1,005	4,990	15,190	11,884	55,372	88,441	303,800	392,241	11,785	35,394
Ontario.....No.	89	13	63	475	6	646	13,108	13,754	676	185
H.P.	4,296	3,892	6,348	18,907	2,745	36,188	411,630	447,818	9,870	25,194
Manitoba.....No.	3	1	5	34		43	1,028	1,071	102	12
H.P.	140	500	735	632		2,007	33,559	35,566	1,400	1,917
Saskatchewan.....No.	19	1	26	59		105	1,826	1,931	151	24
H.P.	1,630	1,250	2,838	1,415		7,133	72,536	79,669	2,064	3,960
Alberta.....No.	170	21	26	217		434	1,789	2,223	396	215
H.P.	38,354	3,230	1,918	5,383		48,885	47,540	96,425	8,948	26,925
British Columbia.....No.	31	7	66	148	62	314	4,241	4,555	1,449	79
H.P.	4,300	16,229	12,049	5,451	28,399	66,428	99,074	165,502	40,682	11,025
Yukon.....No.				1	3	4		4	25	
H.P.				8	15,000	15,008		15,008	3,830	
N.W.T.....No.			1	1		2	73	75		2
H.P.			156	10		166	1,030	1,196		110
Canada.....No.	396	62	305	1,329	133	2,225	34,505	36,730	3,604	760
H.P.	87,944	46,424	41,937	47,188	101,616	325,109	1,040,483	1,365,592	87,683	136,266

or Idle, in the Mineral Industry in Canada, by Industries, 1944—Concluded

IN RESERVE OR IDLE

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines *	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
1			7		8	301	309	6	1	12
50			482		532	14,484	15,016	211	40	1,424
3			9		12	41	53	2	9	3
335			297		632	2,008	2,640	55	830	70
			1		1	14	15	2	7	
			100		100	338	438	40	392	5
2		1	2		5	12	17		2	
170		60	105		335	462	797		150	1,612
15	1	5	8	4	33	121	154		4	21
627	2	522	218	150	1,619	3,813	5,332		135	886
21	1	6	27	4	59	489	548	10	23	41
1,182	2	582	1,202	150	3,118	21,105	24,223	306	1,547	3,992
102	18	72	216	7	416	3,751	4,166	668	144	1,054
13,746	16,462	10,287	11,122	960	52,577	106,280	158,857	13,073	16,819	205,888
77	18	94	274	8	1,290	3,235	3,706	719	154	1,017
11,895	14,230	13,851	14,850	890	193,744	95,939	151,655	25,413	19,631	228,225

or Idle, in the Mineral Industry in Canada, by Provinces, 1944

In reserve or idle

Steam engines	Steam turbines	Diesel engines	Gasoline, gas and oil engines other than Diesel engines	Hydraulic turbines or water wheels	Total primary power	Electric motors run by purchased power	Total power employed	Electric motors run by primary power in same plant	Boilers	Motor generator sets in use and in reserve Total
8		6	18		32	47	79		8	20
853		820	902		2,576	1,629	4,204		2,686	2,580
1			1		2	77	79		2	
50			2		52	575	627		65	
18		16	51		86	1,236	1,322	50	35	286
506	4,000	1,950	3,025		9,481	33,516	42,997	1,385	4,962	30,124
11	2	18	77		108	1,284	1,392	85	40	495
1,775	7	2,971	5,191		9,944	42,251	52,195	4,657	2,793	100,016
		3	4		7	58	65	18	6	28
		501	550		1,051	2,029	3,080	286	530	6,291
2	4	5	7		18	118	136	28	9	45
300	2,680	1,155	280		4,415	3,765	8,180	652	1,330	35,386
44	5	1	29		79	118	197	34	24	73
7,718	2,257	8	445		10,498	4,741	15,169	752	2,204	4,542
18	6	19	29		79	813	892	189	17	103
2,544	7,518	2,290	727	960	14,039	17,774	31,813	3,671	2,194	26,710
								264		3
								1,670		234
		4			4		4		3	1
		592			592		592		55	5
102	18	72	216	7	415	3,751	4,166	668	144	1,054
13,746	16,462	10,287	11,122	960	52,577	106,280	158,857	13,073	16,819	205,888

CHAPTER TWO

THE GOLD MINING INDUSTRY IN CANADA

Including—(a) The Alluvial Gold Mining Industry; (b) The Auriferous Quartz Mining Industry; (c) The Copper-Gold-Silver Mining Industry; (d) Miscellaneous Data on Monetary Gold and World Gold Production, Prices, etc.

Definition of the Industry—Gold mining in Canada is classified into three principal industries—(a) the recovery of gold from the gravels and sands of stream channels or beaches or what is defined as “The Alluvial Gold Mining Industry”; (b) the recovery of lode gold, which is designated “The Auriferous Quartz Mining Industry” and in which industry gold is usually the most important economic constituent of the ores mined and quartz the predominant gangue mineral; (c) gold is often found in various other mineral deposits, more particularly in those of copper, and for this reason the review of Canada’s “Copper-Gold-Silver Mining Industry” is included here to complete a more comprehensive survey of Canadian gold production.

Canadian production of fine gold in 1944 totalled 2,922,911 troy ounces valued at \$112,532,073 compared with 3,651,301 troy ounces worth \$140,575,088 in 1943. The quantity of gold recovered from Canadian ores, of all kinds, during the year under review, was the smallest since 1931 and reflected the strain borne by a nation that had experienced over five years of total war. Many employees of both auriferous quartz and base metal mines have entered the various branches of the armed forces, and the manufacture of certain equipment or materials necessary for the development of new gold mines or expansion in older ones has been considerably restricted or the products of such manufacture diverted for more urgent use in our all out war effort.

Ontario, Quebec and British Columbia retained their positions as the most important gold producing provinces; of the total gold produced in the Dominion in 1944, Ontario contributed 59 per cent, Quebec 25 per cent and British Columbia 7 per cent. The balance of the year’s output came from deposits located in Saskatchewan, Manitoba, Northwest Territories, Yukon, Nova Scotia and Alberta.

Canadian gold production in 1944, according to the nature of the ores from which the metal was recovered, was as follows: placer deposits 1·14 per cent; auriferous quartz ores 83·33 per cent; copper-gold-silver ores 13·04 per cent; nickel-copper ores 1·89 per cent, and silver-lead and other ores 0·60 per cent.

Fine gold production in Canada, from all sources, from 1858 to 1944 inclusive, totalled 92,297,754 troy ounces valued at \$2,684,387,981 in Canadian currency.

Table 37.—Production of New Gold in Canada, by Provinces and Sources, 1943 and 1944
(Gold at \$20·671834 per fine ounce)

	1943		1944	
	Fine troy ounces	\$	Fine troy ounces	\$
NOVA SCOTIA—				
In gold bullion.....	4,129	85,354	5,840	120,724
Estimated exchange equalization on gold produced.....		73,613		104,116
Total Value—Canadian Funds.....		158,967		224,840
QUEBEC—				
In gold bullion.....	578,512	11,958,904	485,892	10,044,279
In anode copper (b).....	331,475	6,852,196	245,886	5,082,915
In ores, etc., exported.....	12,546	259,349	15,006	310,201
Total.....	922,533	19,070,449	746,784	15,437,395
Estimated exchange equalization on gold produced.....		16,447,072		13,313,789
Total Value—Canadian Funds.....		35,517,521		28,751,184

Table 37.—Production of New Gold in Canada, by Provinces and Sources, 1943 and 1944
—Concluded

	1943		1944	
	Fine troy ounces	\$	Fine troy ounces	\$
ONTARIO—				
(c) Porcupine Area—In gold bullion.....	1,020,977	21,105,467	873,062	18,047,793
(c) Kirkland Lake—In gold bullion (a).....	635,393	13,134,739	498,260	10,299,948
(c) Other gold mines—In gold bullion.....	405,007	8,372,237	305,208	6,309,209
In converter copper from nickel-copper ores.....	36,065	745,530	50,516	1,044,259
In ores, matte, etc., exported.....	19,773	408,744	4,790	99,018
Total.....	2,117,215	43,766,717	1,731,836	35,800,227
Estimated exchange equalization on gold produced.....		37,746,060		30,875,459
Total Value—Canadian Funds.....		81,512,777		66,675,686
MANITOBA—				
In gold bullion.....	62,254	1,286,905	40,669	840,703
In blister copper.....	27,184	561,943	31,408	649,261
In ores, etc., exported.....	2,337	48,310	2,091	43,225
Total.....	91,775	1,897,158	74,168	1,533,189
Estimated exchange equalization on gold produced.....		1,636,179		1,322,279
Total Value—Canadian Funds.....		3,533,337		2,855,468
SASKATCHEWAN—				
In alluvial gold.....	4	83	5	103
In gold bullion.....	174,086	3,598,677	122,777	2,538,026
In blister copper.....				
Total.....	174,090	3,598,760	122,782	2,538,129
Estimated exchange equalization on gold produced.....		3,103,705		2,188,978
Total Value—Canadian Funds.....		6,702,465		4,727,107
ALBERTA—				
In alluvial gold.....	21	434	51	1,054
Estimated exchange equalization on gold produced.....		374		909
Total Value—Canadian Funds.....		808		1,963
BRITISH COLUMBIA—				
In alluvial gold.....	11,680	241,447	9,402	194,357
In gold bullion.....	136,340	2,818,397	98,117	2,028,258
In base bullion.....	6,724	138,998	3,399	70,264
In ores, etc., exported.....	86,602	1,790,222	85,939	1,776,516
Total.....	241,346	4,989,064	196,857	4,069,395
Estimated exchange equalization on gold produced.....		4,302,757		3,509,599
Total Value—Canadian Funds.....		9,291,821		7,578,994
YUKON—				
In alluvial gold.....	41,157	850,790	23,816	492,321
In ores exported.....	3	62	2	41
Total.....	41,160	850,852	23,818	492,362
Estimated exchange equalization on gold produced.....		733,808		424,631
Total Value—Canadian Funds.....		1,584,660		916,993
NORTHWEST TERRITORIES—				
In ores, etc., shipped.....	5	103		
In gold bullion produced.....	59,027	1,220,196	20,775	429,457
Total.....	59,032	1,220,299	20,775	429,457
Estimated exchange equalization on gold produced.....		1,052,433		370,381
Total Value—Canadian Funds.....		2,272,732		799,838
Total for Canada.....	3,651,301	75,479,087	2,922,911	60,421,932
Total estimated exchange equalization on gold produced.....		65,096,001		52,110,141
Grand Total Value, including exchange.....		140,575,088		112,532,073

NOTE.—The estimated average price of a troy ounce of fine gold in Canadian funds was \$38.50 in both 1944 and 1943.

(a) Includes production of Larder Lake area.

(b) Includes a considerable quantity of gold recovered from gold ores.

(c) Includes certain quantities of gold contained in slags, ores, etc., shipped to Canadian and foreign smelters.

Table 38.—Estimated Average Monthly Value of an Ounce of Fine Gold, Expressed in Canadian Funds, 1931-1944

Month	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940 (1944)
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
January.....	20.71	24.24	23.64	33.05	34.95	35.06	35.01	34.99	35.30	38.50
February.....	20.67	23.67	24.74	35.29	35.05	35.18	35.01	35.00	35.19	38.50
March.....	20.67	23.11	24.78	35.08	35.40	35.11	34.98	35.05	35.13	38.50
April.....	20.68	22.98	25.33	34.93	35.18	35.13	34.95	35.15	35.15	38.50
May.....	20.68	23.38	27.75	34.94	34.95	35.00	34.94	35.22	35.13	38.50
June.....	20.73	23.83	28.24	34.73	35.05	35.09	35.02	35.36	35.07	38.50
July.....	20.74	23.73	30.58	34.59	35.08	34.91	35.05	35.24	35.06	38.50
August.....	20.73	23.61	30.09	34.19	35.09	35.00	35.00	35.12	35.01	38.50
September.....	21.55	22.88	31.79	34.18	35.28	34.99	35.00	35.12	37.21	38.50
October.....	23.22	22.65	31.48	34.27	35.49	34.99	34.99	35.32	38.43	38.50
November.....	23.22	23.73	32.68	34.16	35.37	34.95	34.98	35.25	38.50	38.50
December.....	25.01	23.85	32.14	34.57	35.33	34.98	34.93	35.28	38.50	38.50
Yearly average.....	21.55	23.47	28.60	34.50	35.19	35.03	34.99	35.17	36.14	38.50

NOTE: Procedure regarding the marketing of gold by the Department of Finance, Ottawa, is noted elsewhere in this report. At December 31, 1944 the price paid by the United States Treasury for gold purchased by the Mints continued at \$35 per troy ounce of fine gold, less $\frac{1}{2}$ of 1 per cent. Actual payment by the United States Treasury for gold in imported and domestic ore or concentrate was at 99.75 per cent of the price quoted by the Treasury, which at the close of 1944, was equal to \$34.9125 per ounce. The United States Senate Banking and Currency Committee, on March 14, 1945, rejected a proposal to increase the price of gold from \$35 an ounce to \$56. The Committee voted to reduce to 25 per cent the gold reserve requirements against Federal Reserve Bank deposits and notes.

Table 39.—Production of Gold in Canada, by Principal Mines, 1944

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	tons	tons	tons	fine oz.	tons	
NOVA SCOTIA—						
Consolidated Mining & Smelting Co. of Canada Ltd.....	8,177		8,202	(b) 424	40	(a)
Queens Mines Ltd.....	7,391		7,391	1,497	120	(a)
Total Nova Scotia.....				(c) 5,840		

FOOTNOTES—

(a) Amalgamation.

(b) In addition, 42 ounces of gold were contained in concentrates produced but not treated.

(c) Receipts at Royal Canadian Mint, Ottawa.

QUEBEC—						
Beattie Gold Mines (Quebec) Ltd.....	131,490		124,600	13,339	1,800	(c) (b)
Bellefleur Quebec Mines Ltd.....	126,695	16,031	110,257	40,048	350	(c)
Canadian Malartic Gold Mines Ltd.....	334,575		334,575	36,118	1,000	(c)
Cere, Gustave.....	1,100	800	300	2,060	12	
East Malartic Mines Ltd.....	290,873		290,873	39,288	1,500	(c)
Francoeur Gold Mines Ltd.....	65,628		65,628	10,676	175	(c) (d)
Lamaque Mining Co. Ltd.....	203,435		203,435	52,696	1,200	(c)
Malartic Gold Fields Ltd.....	207,339		207,339	35,644	750	(c)
McWatters Gold Mines Ltd.....	18,202	186	18,016	2,770	150	(c) (e)
Mic-Mac Mines Ltd.....	177,737		177,967	21,077	650	(a) (f)
O'Brien Gold Mines Ltd.....	53,597		53,590	26,034	200	(a) (c) (g)
Perron Gold Mines Ltd.....	109,180	7,502	101,678	23,766	425	(c)
Powell Rouyn Gold Mines Ltd.....	190,361		186,725	22,328	450	(h)
Senator-Rouyn Ltd.....	95,030		93,101	12,815	300	(c)
Sigma Mines (Quebec) Ltd.....	304,967		304,967	57,098	1,100	(c)
Sisocoe Gold Mines Ltd.....	369,290	44,812	324,478	39,432	1,000	(a) (c)
Sladen-Malartic Mines Ltd.....	207,215		207,215	19,901	700	(c)
Stadacona Rouyn Mines Ltd.....	137,420		137,420	23,029	500	(c)
Sullivan Consolidated Mines Ltd.....	161,923	18,218	140,146	30,925	500	(c)
West Malartic Mines Ltd.....	84,832		84,220	10,655	300	(c)
Total Principal Gold Mines.....	3,270,889	87,549	3,166,530	519,699	12,997	
Copper-gold-silver and other ores.....				227,105		(i)
Total Quebec.....				746,784		

FOOTNOTES—

(a) Amalgamation.

(b) Also shipped refined arsenic; milling suspended September 30.

(c) Cyanided.

(d) Milling suspended October 31; ore treated included 17,227 tons silicious ore shipped to smelter.

(e) Milling suspended August 31.

(f) Concentrates shipped to smelter; in addition 112 ounces gold contained in concentrates not shipped.

(g) Also shipped crude arsenic.

(h) All crude ore shipped to smelter for treatment.

(i) Production taken off chiefly at smelter.

Table 39.—Production of Gold in Canada, by Principal Mines, 1944—Continued

Property and Province	Ore raised tons	Material sorted (discarded) tons	Ore treated tons	Gold production fine oz.	Mill capacity 24 hours tons	See footnotes
ONTARIO—						
<i>Porcupine District</i>						
Amor Gold Mines Ltd.	137,321		137,321	50,154	300	(c)
Bonetal Gold Mines Ltd.	28,877	2,870	26,081	3,912		(c)
Broullan Porcupine Mines Ltd.	112,808	12,327	100,481	20,001	350	(c)
Buffalo Ankerite Gold Mines Ltd.	237,183	2,842	235,442	41,066	1,200	(c)
Coniaurum Mines Ltd.	98,540		98,540	26,905	600	(c)
Delnite Mines Ltd.	92,894		93,112	14,799	520	(c)
Dome Mines Ltd.	519,800		519,800	134,230	1,700	(a) (c)
Hallnor Mines Ltd.	102,742		102,742	41,145	400	(c)
Hollinger Cons. Gold Mines Ltd. (Ross)	77,486		77,544	14,247	300	(c)
Hollinger Cons. Gold Mines Ltd. (Timmins)	954,611		955,447	226,434	3,900	(c)
Hoyle Gold Mines Ltd.				1,101		(b)
McIntyre Porcupine Mines Ltd.	591,210		589,940	170,636	2,400	(c)
Pamour Porcupine Mines Ltd.	470,532		470,532	41,908	1,600	(c)
Paymaster Cons. Mines Ltd.	117,933		132,063	28,754	600	(c)
Preston East Dome Mines Ltd.	248,970		249,268	57,561	1,000	(a) (c)
<i>Kirkland Lake District</i>						
Bidgood Kirkland Gold Mines Ltd.	48,609		48,594	8,966	125	(c)
Kirkland Lake Gold Mining Co. Ltd.	77,457		77,457	27,326	400	(c)
Lake Shore Mines Ltd.	258,544		258,544	109,469	2,300	(c)
Macassa Mines Ltd.	83,392		83,392	36,241	400	(c)
Sylvanite Gold Mine Ltd.	137,498		137,822	44,650	600	(c)
The Teck-Hughes Gold Mines Ltd.	102,920		102,920	25,660	600	(c)
Toburn Gold Mines Ltd.	40,864	924	39,940	12,780	175	(c)
Upper Canada Mines Ltd.	78,036		78,036	27,461	250	(c)
Wright Hargreaves Mines Ltd.	184,520		184,520	90,614	1,200	(c)
<i>Larder Lake District</i>						
Chesterville Larder Lake Gold Mining Co. Ltd.	152,696		152,696	18,590	700	(c)
Kerr-Addison Gold Mines Ltd.	484,844		484,683	80,722	1,800	(c)
Omega Gold Mines Ltd.	115,675		115,675	15,526	500	(c)
<i>Matatchewan District</i>						
Hollinger Cons. Gold Mines Ltd. (Young-Davidson)	162,999		161,773	14,567	1,050	(c)
Matatchewan Consolidated Mines Ltd.	179,586		179,586	14,068	1,000	(c)
<i>Sudbury District</i>						
Jerome Gold Mines Ltd.					500	(d)
<i>Thunder Bay District</i>						
Hard Rock Gold Mines Ltd.	109,932	18,885	91,047	21,776	450	(c)
Leitch Gold Mines Ltd.	25,673	4,436	21,727	16,209	90	(a) (c)
Little Long Lac Gold Mines Ltd.	83,313	15,775	67,538	22,782	300	(a) (c)
MacLeod-Cockshutt Gold Mines Ltd.	180,222	32,021	124,964	39,900	650	(c)
<i>Patricia District</i>						
Berens River Mines Ltd.	40,436		40,436	10,048	225	(e)
Central Patricia Gold Mines Ltd.	91,512		91,512	29,569	400	(c)
Cochonour Willans Gold Mines Ltd.	44,925		44,928	19,932	250	(a) (c) (f)
Hasaga Gold Mines Ltd.	142,344	24,000	118,249	16,789	350	(c)
Madsen Red Lake Gold Mines Ltd.	132,759		132,759	37,547	400	(a) (c)
McKenzie Red Lake Gold Mines Ltd.	93,588	15,309	78,279	19,013	250	(c)
McMarmac Red Lake Gold Mines Ltd.	31,890		31,890	5,060	75	(c) (g)
Pickle Crow Gold Mines Ltd.	69,368	6,130	63,388	37,699	400	(a) (c)
Total Principal Gold Mines	6,944,512	135,519	6,800,568	1,675,817	30,310	
Nickel-copper mines				55,286		
Other mines				733		
Total Ontario				1,731,836		

FOOTNOTES—

- (a) Amalgamation.
 (b) No operations; concentrates shipped from stock.
 (c) Cyanided.
 (d) Development work only.
 (e) Chiefly gold content of precipitate shipped; in addition, there are lead and zinc concentrates exported.
 (f) Exclusive of gold in 246 tons concentrates not shipped to smelter.
 (g) Operations suspended October 15.

MANITOBA—						
San Antonio Gold Mines Ltd.	140,085		140,085	40,669	550	(a) (c)
Copper-gold-silver and other mines				33,499		(b)
Total Manitoba				74,168		

FOOTNOTES—

- (a) Amalgamation.
 (b) Ores smelted.
 (c) Cyanided.

Table 39.—Production of Gold in Canada, by Principal Mines, 1944—Concluded

Property and Province	Ore raised	Material sorted (discarded)	Ore treated	Gold production	Mill capacity 24 hours	See footnotes
	tons	tons	tons	fine oz.	tons	
SASKATCHEWAN—						
Copper-gold-silver and other ores.....				122,782		(a)
FOOTNOTE—						
(a) Ores smelted; includes 5 ounces placer gold.						
ALBERTA—						
Placer gold.....				51		
BRITISH COLUMBIA—						
Bralorne Mines Ltd.....	115,391	5,640	109,751	70,350	500	(a) (b)
Cariboo Gold Quartz Mining Co. Ltd.....	32,832		33,040	13,588	375	(a) (b) (c)
Hedley Mascot Gold Mines Ltd.....	40,171		42,285	13,434	200	(b) (c)
Island Mountain Mines Co. Ltd.....	21,186		21,186	9,441	150	(b) (c)
Kelowna Exploration Co. Ltd.....	88,491		88,491	32,526	275	(b)
Pioneer Gold Mines of B.C. Ltd.....	16,989	2,776	16,865	9,111	350	(a) (b) (c)
Sheep Creek Gold Mines Ltd.....	13,092		13,092	4,781	150	(c) (d)
Silbak Premier Mines Ltd.....	68,496		68,496	15,289	500	(b) (e)
Total Principal Gold Mines.....	396,648	8,416	393,206	168,520	2,500	
Placer gold.....				9,402		
Copper-gold ores.....				14,852		
Silver-lead and other ores.....				4,083		
Total British Columbia.....				196,857		
FOOTNOTES—						
(a) Amalgamation.						
(b) Concentrates shipped to smelter.						
(c) Cyanided.						
(d) Milling suspended August 31.						
(e) Concentrates also included 115,400 ounces silver and 3,189,000 pounds lead.						
YUKON—						
Placers.....				23,816		
Silver-lead ores.....				2		(*)
Total Yukon.....				23,818		
FOOTNOTE—						
(*) In ores exported.						
NORTHWEST TERRITORIES—						
Negus Mines Ltd.....	22,007	3,336	18,869	20,723	66	(a) (b) (c)
Other gold ores.....				52		
Total Northwest Territories.....				20,775		
FOOTNOTES—						
(a) Amalgamation.						
(b) Milling suspended October 18.						
(c) Cyanided.						
CANADA—						
Total Canada.....				2,922,911		

Table 40.—Production of New Gold* by Provinces and Territories, 1932-1944

Year	Nova Scotia		Quebec		Ontario		Manitoba	
	Fine ounces	\$	Fine ounces	\$	Fine ounces	\$	Fine ounces	\$
1932.....	964	22,634	401,105	9,417,572	2,280,105	53,534,743	122,507	2,876,350
1933.....	1,382	39,525	382,886	10,950,539	2,155,519	61,647,843	125,310	3,583,866
1934.....	3,525	121,613	390,097	13,458,347	2,105,339	72,634,195	132,321	4,565,075
1935.....	9,376	329,942	470,552	16,558,725	2,220,336	78,133,624	142,613	5,018,551
1936.....	11,960	418,959	666,905	23,361,683	2,378,503	83,818,960	139,273	4,878,733
1937.....	19,918	696,931	711,480	24,894,685	2,587,095	90,522,454	157,949	5,526,636
1938.....	26,560	934,248	881,263	30,998,426	2,896,477	101,883,578	185,706	6,532,209
1939.....	29,943	1,082,170	953,377	34,455,998	3,086,076	111,533,873	180,875	6,537,003
1940.....	22,219	855,432	1,019,175	39,238,238	3,261,698	125,574,988	152,295	5,863,357
1941.....	19,170	738,045	1,089,339	41,939,552	3,194,308	122,980,858	150,553	5,796,290
1942.....	12,989	500,076	1,092,388	42,056,938	2,763,819	106,407,032	136,226	5,244,701
1943.....	4,129	158,967	922,533	35,517,521	2,117,215	81,512,777	91,775	3,533,337
1944.....	5,840	224,840	746,784	28,751,184	1,731,836	66,675,686	74,168	2,855,468
Total.....	167,975	6,123,382	9,727,884	351,599,408	32,778,326	1,156,860,611	1,791,571	62,811,576
Year	Saskatchewan		British Columbia		Yukon		Northwest Territories	
	Fine ounces	\$	Fine ounces	\$	Fine ounces	\$	Fine ounces	\$
1932.....	11	258	199,004	4,672,429	40,608	953,438	.....	.....
1933.....	5,400	154,440	238,995	6,835,257	39,493	1,129,500	.....	.....
1934.....	5,405	186,472	296,196	10,218,762	38,798	1,338,531	.....	.....
1935.....	14,323	504,026	391,633	13,781,565	35,707	1,256,529	200	7,038
1936.....	48,981	1,715,805	451,938	15,831,388	50,358	1,764,041	1	35
1937.....	65,886	2,305,351	505,857	17,699,936	47,982	1,678,890	.....	.....
1938.....	50,021	1,759,489	605,617	21,302,578	72,368	2,545,544	6,800	239,190
1939.....	77,120	2,787,194	626,970	22,659,323	87,745	3,171,192	51,914	1,876,224
1940.....	102,925	3,962,613	617,011	23,754,924	80,458	3,097,635	55,159	2,123,621
1941.....	138,015	5,313,578	608,203	23,415,816	70,959	2,731,922	74,417	2,865,054
1942.....	178,871	6,886,533	474,339	18,262,052	83,246	3,204,971	99,394	3,826,669
1943.....	174,090	6,702,465	241,346	9,291,821	41,160	1,584,660	59,032	2,272,732
1944.....	122,782	4,727,107	196,857	7,578,994	23,818	916,993	20,775	799,838
Total...	983,830	37,005,331	5,453,966	195,304,845	712,700	25,373,844	367,692	14,010,401

NOTE: The annual production in Alberta was less than 400 ounces for any of the years specified.

(*) From all sources.

Table 41.—Canadian Gold Production According to Method of Computation and Recovery, 1932-1944

Year	In alluvial gold	In crude gold bullion produced at mines (a)	In base bullion produced at lead smelters	In blister and anode copper produced (b)	In ores, matte, slags, etc., exported	Total gold produced
	%	%	%	%	%	fine oz.
1932.....	1.8	79.3	1.0	15.1	2.8	3,044,387
1933.....	2.0	79.8	0.7	14.2	3.3	2,949,309
1934.....	2.0	78.7	1.1	13.4	4.8	2,972,074
1935.....	1.8	78.3	2.2	13.2	3.9	3,284,890
1936.....	2.2	77.4	1.6	13.8	5.0	3,748,028
1937.....	2.2	80.2	0.9	11.7	5.0	4,096,213
1938.....	2.5	80.8	0.9	11.2	4.5	4,725,117
1939.....	2.5	82.1	0.6	10.4	4.4	5,094,379
1940.....	2.1	82.7	0.6	10.0	4.6	5,311,145
1941.....	2.0	82.6	0.4	10.3	4.7	5,345,179
1942.....	2.3	80.8	0.2	12.1	4.6	4,841,306
1943.....	1.45	78.71	0.19	15.61	4.04	3,651,301
1944.....	1.14	78.98	0.12	15.41	4.35	2,922,911

(a) Includes a relatively small quantity of gold contained in shipments of gold ores, slags, etc., to Canadian smelters.

(b) Canadian blister copper is sometimes refined in the United States; also contains a relatively small quantity of gold recovered from auriferous quartz ores.

Table 42.—Gold Recovered in Canada According to Nature of Ore, by Provinces, 1940-1944

Year and Province	Placer gold	Auriferous quartz ores (†)	Copper-gold-silver ores	Nickel-copper ores	Silver-lead and other ores	Total
	oz.	oz.	oz.	oz.	oz.	oz.
1940						
Nova Scotia.....		22,219				22,219
Quebec.....		751,942	267,233			1,019,175
Ontario.....		3,170,823		90,863	2	3,261,688
Manitoba.....		76,897	75,398			152,295
Saskatchewan.....	69	20,863	81,993			102,925
Alberta.....	215					215
British Columbia.....	32,128	509,260	54,731		20,892	617,011
Northwest Territories.....	3	55,156				55,159
Yukon.....	79,905	292			261	80,458
Total Canada.....	112,320	4,607,452	479,355	90,863	21,155	5,311,145
1941						
Nova Scotia.....		19,170				19,170
Quebec.....	9	813,158	276,172			1,089,339
Ontario.....		3,116,303		77,960	45	3,194,308
Manitoba.....		80,330	70,223			150,553
Saskatchewan.....	57	24,631	113,327			138,015
Alberta.....	215					215
British Columbia.....	35,020	516,941	35,010		21,232	608,203
Northwest Territories.....	39	74,378				74,417
Yukon.....	70,847				112	70,959
Total Canada.....	106,187	4,614,911	494,732	77,960	21,389	5,345,179
1942						
Nova Scotia.....		12,989				12,989
Quebec.....		811,714	280,580		94	1,092,388
Ontario.....		2,692,828		70,861	130	2,763,819
Manitoba.....		85,193	51,033			136,226
Saskatchewan.....	9	15,141	163,721			178,871
Alberta.....	34					34
British Columbia.....	26,323	418,048	19,892		10,076	474,339
Northwest Territories.....		99,394				99,394
Yukon.....	83,198				48	83,246
Total Canada.....	109,564	4,135,307	515,226	70,861	10,348	4,841,306
1943						
Nova Scotia.....		4,129				4,129
Quebec.....		625,429	284,112		(*) 12,992	922,533
Ontario.....		2,061,376	1	55,776	62	2,117,215
Manitoba.....		62,254	29,521			91,775
Saskatchewan.....		4	174,086			174,090
Alberta.....	21					21
British Columbia.....	11,680	205,850	18,137		5,679	241,346
Northwest Territories.....		59,032				59,032
Yukon.....	41,157				3	41,160
Total Canada.....	52,858	3,018,074	505,857	55,776	18,736	3,651,301
1944						
Nova Scotia.....		5,840				5,840
Quebec.....		522,894	209,989		(*) 13,901	746,784
Ontario.....		1,076,486		55,286	64	1,731,836
Manitoba.....		40,669	33,499			74,168
Saskatchewan.....	5		122,777			122,782
Alberta.....	51					51
British Columbia.....	9,402	169,132	14,852		3,471	196,557
Northwest Territories.....		20,775				20,775
Yukon.....	23,816				2	23,818
Total Canada.....	33,274	2,435,796	381,117	55,286	17,438	2,922,911

(†) Contains a relatively small quantity of gold recovered from certain complex ores (lead, copper, etc.) which are difficult to classify. This applies especially to British Columbia ores.

(*) Includes production of Golden Manitou mine which was classified prior to 1943 as auriferous quartz.

Table 43.—Gold Production of the World (a)—(In fine ounces)—1938 and 1944

Country	1938	1944
(Taken from American Bureau of Metal Statistics)		
NORTH AMERICA—		
United States.....	5,008,178	1,001,865
Canada.....	4,725,117	2,913,716
Mexico.....	923,819	650,000
Newfoundland.....	24,104	18,500
Total North America.....	10,681,218	4,584,081
CENTRAL AMERICA AND WEST INDIES.....	164,000	295,000
SOUTH AMERICA—		
Brazil.....	174,041	270,000
Chile.....	294,092	200,000
Colombia.....	520,715	553,530
Ecuador.....	74,042	120,000
Peru.....	260,319	* 200,000
Guiana—British.....	38,482	* 18,000
Dutch.....	12,000	5,000
French.....	40,605	* 20,000
Venezuela.....	114,978	77,716
Other South America.....	40,000	25,000
Total South America.....	1,569,274	1,489,246
EUROPE—		
Czechoslovakia.....	10,000	
France.....	87,354	
Yugoslavia.....	78,301	
Romania.....	172,453	
Russia and Siberia.....	* 5,800,000	
Sweden.....	234,116	
Other Europe.....	45,000	
Total Europe.....	6,427,224	* 4,500,000
OCEANIA—		
New South Wales.....	88,708	62,610
Queensland.....	151,432	* 90,000
Victoria.....	144,243	52,000
Western Australia.....	1,167,792	466,261
Tasmania.....	22,200	* 20,000
New Guinea.....	236,397	
New Zealand.....	152,050	150,000
Fiji.....	92,400	* 60,000
Other Oceania (c).....	52,600	* 40,000
Total Oceania.....	2,107,822	940,871
ASIA—		
British India.....	322,397	187,200
China, including Manchuria.....	188,000	
Korea.....	948,447	
Netherlands Indies.....	76,300	
Formosa.....	* 60,000	
Japan.....	* 760,000	
Other Asia.....	104,000	
Total Asia.....	2,459,144	* 1,500,000
AFRICA—		
Belgian Congo.....	473,246	(d)
French West Africa.....	127,153	(d)
Kenya.....	69,436	(d)
Madagascar.....	13,760	(d)
Rhodesia.....	815,191	595,000
British West Africa (b).....	729,754	566,000
Tanganyika.....	82,168	100,000
Transvaal, Cape Colony and Natal.....	12,161,392	12,277,228
Other Africa.....	150,000	(d)
Total Africa.....	14,622,100	13,800,000
Totals for World.....	33,030,782	27,109,198

(a) In compiling this table free use has been made of the reports of the United States Director of the Mint. Production of the Philippine Islands is included with the United States in this table.

(b) Comprising Gold Coast, Sierra Leone and Nigeria.

(c) Includes Papua.

(d) Not reported; estimate has been included in total.

(*) Conjectural.

Table 44.—Comparative Figures of Gold Production for the World Since the Discovery of America, also Production for Russia, Transvaal, United States and Canada

Year	Russia (a)	Transvaal since the commence- ment of Fields (i)	United States (f) (a)	Canada since the recording of production in 1858	(a) World since the discovery of America
	fine ounces	fine ounces	fine ounces	fine ounces	fine ounces
1493-1600.....					24,266,820
1601-1700.....					29,330,455
1701-1800.....					61,088,215
1801-1840.....					20,488,552
1841-1850.....			(c) 1,187,170		17,605,018
1851-1880.....				220,039	64,482,933
1861-1870.....			(d) 58,279,778	1,477,999	61,098,343
1871-1880.....			(e) 15,281,264	904,093	55,670,618
1881-1890.....		1,070,651	15,808,339	584,102	51,280,184
1891-1895.....		6,870,158	9,106,834	291,564	39,412,823
1896-1900.....		12,578,869	15,728,572	3,469,791	62,234,698
1901-1905.....		13,632,908	19,393,722	4,592,261	78,033,650
1906.....		5,792,823		556,415	19,471,080
1907.....		6,450,740		405,517	19,977,260
1908.....		7,056,266	22,993,218	476,112	21,422,244
1909.....		7,295,108		453,865	21,965,111
1910.....		7,527,108		493,707	22,022,180
1911.....		8,249,461	4,687,053	473,159	22,397,136
1912.....		9,107,512	4,520,719	611,885	22,605,068
1913.....	(g) 1,583,677	8,798,336	4,299,784	802,973	22,556,347
1914.....	1,733,914	8,394,322	4,572,976	773,178	21,652,883
1915.....	1,382,450	9,093,902	4,887,604	918,056	22,846,608
1916.....	1,089,885	9,296,618	4,479,057	930,492	22,032,542
1917.....	871,265	9,018,084	4,051,440	738,831	20,346,043
1918.....	554,558	8,418,292	3,320,784	699,681	18,588,127
1919.....	173,610	8,331,294	2,918,628	766,764	17,339,679
1920.....	73,945	8,158,226	2,476,166	765,007	16,146,830
1921.....	65,907	8,128,681	2,422,006	926,329	15,997,692
1922.....	191,614	7,009,767	2,363,075	1,263,364	15,496,859
1923.....	305,425	9,148,771	2,502,632	1,233,341	17,845,349
1924.....	546,550	9,574,918	2,528,900	1,525,882	18,619,481
1925.....	632,390	9,597,573	2,411,987	1,735,735	18,673,178
1926.....	760,605	9,954,762	2,335,042	1,754,228	19,117,568
1927.....	688,492	10,122,459	2,197,125	1,852,785	19,058,736
1928.....	385,800	10,354,157	2,233,251	1,890,592	18,885,849
1929.....	707,300	10,412,325	2,208,386	1,928,308	19,207,452
1930.....	1,501,083	10,716,349	2,285,603	2,102,068	20,903,736
1931.....	1,655,725	10,877,708	2,395,878	2,693,892	22,284,290
1932.....	1,938,000	11,557,858	2,449,032	3,044,387	24,098,676
1933.....	2,700,000	11,012,340	2,556,246	2,949,309	25,400,295
1934.....	3,858,000	10,479,194	3,091,183	2,972,074	27,372,374
1935.....	4,784,030	10,773,041	3,609,283	3,284,890	29,999,245
1936.....	(h) 6,500,000	11,535,092	4,357,394	3,748,028	32,930,554
1937.....	(h) 5,900,000	11,734,553	4,804,540	4,006,213	35,118,298
1938.....	(h) 5,800,000	12,161,375	5,089,811	4,725,117	37,703,334
1939.....	(h) 5,000,000	12,821,061	5,611,171	5,094,379	39,534,430
1940.....	(h) 4,900,000	14,037,741	(j) 6,003,105	5,311,145	41,067,101
1941.....	(b) 14,386,361	(l) 5,976,419	(i) 5,345,179	(k) 40,332,204	(m) 40,332,204
1942.....	(b) 14,120,617	(n) 3,741,806	(m) 4,841,306	(l) 36,051,301	(n) 36,051,301
1943.....	(b) 12,800,021	(q) 1,394,522	(o) 3,651,301	(p) 2,922,911	(o) 2,922,911
1944.....	(b) 12,277,228	(p) 1,002,000			
Total.....		420,534,631	273,563,505	(r) 92,297,754	

(a) Supplied by United States Mint.

(b) Not available.

(c) 1792-1847.

(d) 1848-1872.

(e) 1873-1880.

(f) Including Philippine Islands production received in United States. Data represent receipts at United States Mint's refineries assay offices.

(g) Data not available for preceding years. A revision by the United States Mint of estimated Russian gold production for the years 1913 to 1934 was made from United States consular reports, based principally on Soviet publications. While available data are quite indefinite and in many instances, contradictory, it is believed that this revision more nearly represents actual production than data heretofore used. Figures for Russian production since 1937 supplied by American Bureau of Metal Statistics.

(h) Subject to revision. American Bureau of Metal Statistics.

(i) Annual Report—Department of Mines, Union of South Africa. 1941 to 1944 figures, Transvaal Chamber of Mines.

(j) Includes 1,140,126 fine ounces received from Philippines.

(k) Includes conjectural data for Russia.

(l) Includes 1,144,332 fine ounces from Philippine Islands.

(m) The Mining Journal, London—subject to revision.

(n) Includes 158,726 ounces received from Philippine Islands.

(o) Omitted due to incomplete data.

(p) American Bureau of Metal Statistics—preliminary.

(q) Includes 13,764 ounces received from Philippine Islands.

(r) The total value of Canadian gold production from 1858-1944 inclusive totalled \$2,684,387,981.

Table 45.—Precious Metals Consumed by the Jewellery and Silverware Industry in Canada, 1942, 1943 and 1944

Material	Cost at works		
	1942	1943	1944
	\$	\$	\$
Fine gold.....	2,789,986	3,138,717	3,665,017
Gold alloys.....	607,604	704,571	826,199
Fine silver.....	1,476,788	1,421,459	1,749,154
Sterling silver and silver alloys.....	754,421	837,907	1,014,775
Platinum.....	361,006	169,467	150,966
Old gold, jewellers' findings, waste and scrap for refining.....	1,324,155	1,828,996	1,379,536
Gold-filled wire and stock.....	557,245	269,249	349,871
Precious and semi-precious stones.....	697,703	724,011	1,252,769

GOLD EXPORTS

(Order-in-Council P.C. 9312—December 15, 1944)

WHEREAS by Order in Council, P.C. 1150, dated May 17, 1932, regulations respecting the export of gold whether in the form of coin or bullion, from the Dominion of Canada, were made under the authority of The Gold Export Act;

AND WHEREAS the said regulations were by Order in Council, P.C. 207, dated January 13, 1944, continued in force until December 31, 1944;

AND WHEREAS in the opinion of the Minister of Finance it is expedient that the said regulations be continued in force beyond December 31, 1944;

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of the said "The Gold Export Act", is pleased to order that the provisions of the said Regulations be and they are hereby continued in force and effect until December 31, 1945, unless sooner rescinded by Order in Council.

NOTE.—Order in Council P.C. 1150, reads, in part, as follows: "The export of gold, whether in the form of coin or bullion (including ore, etc.), from the Dominion of Canada, is hereby prohibited, except in such cases as may be deemed advisable by the Minister of Finance, and under license to be issued by him. . . ."

GOLD IN CANADIAN TRADE STATISTICS

The publication of statistics showing the gross imports and exports of gold has been temporarily suspended as from September, 1939. Statistics for periods prior to that time have been accordingly revised to exclude all gold formerly included in the total of merchandise exports.

Statistics showing the net exports of non-monetary gold, including changes in stocks held under earmark, are published as a supplement to the trade figures, and are given below.

Exports of gold in Canadian trade statistics were distinguished in previous reports as between monetary and non-monetary. Monetary gold exports were described as those which entailed a reduction in the Dominion's monetary gold stocks. All other gold exported (classed as non-monetary) were shown as merchandise, and included with the total merchandise exports.

The fact that gold is a money metal gives it peculiar attributes which distinguish it from other commodities in trade. In particular, the movement of gold in international trade is determined almost exclusively by monetary factors. The amount of exports may fluctuate widely from month to month owing to other than ordinary trade or commercial considerations. In addition, gold is generally acceptable. It does not have to surmount tariff barriers and is normally assured a market at a relatively fixed price. For these reasons, provision was made in previous trade reports for a supplementary table showing exports from Canada excluding all gold.

It is further to be noted that gold does not move in international trade in any direct or normal relation to sales and purchases. It may be bought or sold abroad without moving in or out across the frontier, the sales or purchases in such cases being recognized by simply setting aside or "earmarking" the gold in the vaults of the central bank. Trade statistics deal only with physical movements, sales or purchases of gold which do not involve an actual movement being more properly regarded as an "invisible item" and taken care of in the "International Balance of Payments" statements. Changes in the Bank of Canada's stock of gold under earmark do not enter, therefore, into the trade statistics.

Table 46.—Trade of Canada, by Months, January, 1941 to December, 1944
(External Trade Branch, D.B.S.)

Balance of Trade (Excluding Gold)

Month	1941	1942	1943	1944
	\$	\$	\$	\$
January.....	— 9,429,803	+ 10,180,853	+ 51,236,770	+ 119,620,647
February.....	+ 10,892,522	+ 48,641,010	+ 55,052,562	+ 90,896,845
March.....	— 5,023,835	+ 32,063,651	+ 60,460,065	+ 139,157,039
April.....	+ 12,124,675	+ 27,884,655	+ 78,378,660	+ 149,193,311
May.....	+ 34,566,669	+ 88,179,951	+ 98,913,387	+ 211,811,232
June.....	+ 31,898,663	+ 58,170,621	+ 104,375,178	+ 193,508,555
July.....	+ 43,193,512	+ 59,824,137	+ 155,643,568	+ 133,330,706
August.....	+ 12,582,786	+ 45,905,877	+ 145,971,168	+ 101,862,939
September.....	+ 5,905,452	+ 81,170,827	+ 110,097,386	+ 107,630,886
October.....	— 1,141,275	+ 72,774,449	+ 99,953,595	+ 158,399,115
November.....	+ 29,888,112	+ 82,758,195	+ 133,101,370	+ 175,855,893
December.....	+ 26,205,413	+ 133,669,887	+ 173,091,680	+ 142,933,247
Total.....	+ 191,662,891	+ 741,224,113	+ 1,266,275,389	+ 1,724,200,415

Net Exports of Non-Monetary Gold

(Additional to Balance of Trade—Millions of Dollars)

January.....	19.2	15.1	13.9	9.4
February.....	14.7	16.6	12.8	8.1
March.....	19.7	16.1	12.8	12.9
April.....	14.3	14.1	13.5	9.3
May.....	16.1	15.5	12.5	9.4
June.....	18.4	16.8	12.2	10.9
July.....	17.3	16.3	10.0	6.6
August.....	12.6	13.1	10.2	10.0
September.....	21.2	15.0	11.8	8.7
October.....	17.4	19.3	11.3	8.4
November.....	15.4	12.6	8.8	10.1
December.....	17.4	13.9	12.2	5.9
Total.....	203.7	184.4	142.0	109.7

Table 47.—World's Monetary Stocks of Gold at the Close of 1940, 1942 and 1943
(Subject to Revision)

(Compiled by the United States Mint from available data)

(Stated in United States money)

Country	Total Gold Stock Value, 1940 (e)	Per capita	Total Gold Stock Value, 1942 (e)	Per capita	Total Gold Stock Value, 1943 (e)	Per capita
	\$	\$	\$	\$	\$	\$
United States (d).....	21,991,102,000	165.98	22,726,255,000	168.85	21,937,794,000	159.65
Canada (f).....	7,251,000	0.63	5,629,000	0.49	5,346,000	0.46
Mexico.....	47,000,000	2.45	39,000,000	1.95	203,000,000	9.60
Argentina.....	438,078,000	34.33	353,728,000	25.80	939,000,000	68.50
Brazil.....	51,000,000	1.18	115,140,000	2.66	254,563,000	5.89
Belgium.....	736,000,000	88.03	735,000,000	89.02	734,000,000	88.89
Denmark.....	52,003,000	13.82	44,000,000	11.39	44,000,000	11.39
France.....	2,000,068,000	47.73	2,000,000,000	47.64	2,000,000,000	47.37
Germany.....	40,280,000	0.60	29,000,000	0.42	29,000,000	0.42
Great Britain.....	1,991,000	0.04	1,000,000	0.02	4,665,000	0.10
Italy.....	137,000,000	3.13	(a)	(a)	(a)	(a)
Netherlands.....	617,299,000	71.49	506,000,000	56.71	500,000,000	56.03
Norway.....	84,388,000	29.03	(a)	(a)	(a)	(a)
Portugal.....	92,284,000	12.69	59,000,000	7.60	60,000,000	7.73
Roumania.....	157,400,000	8.01	241,000,000	12.09	316,000,000	15.85
Russia (Soviet Union).....	(a)	(a)	(a)	(a)	(a)	(a)
Spain.....	(a)	(a)	42,000,000	1.60	91,000,000	(a)
Sweden.....	304,955,000	48.52	335,000,000	52.58	387,000,000	60.74
Switzerland.....	502,115,000	120.29	824,000,000	193.56	964,000,000	226.45
British India (ex. Burma).....	274,480,000	0.81	274,392,000	0.71	274,392,000	0.71
Japan (including Chosen, Taiwan, Kwantung).....	163,570,000	1.61	(a)	(a)	(a)	(a)
Netherlands East Indies.....	139,659,000	2.17	(a)	(a)	(a)	(a)
Egypt and Anglo Egyptian Sudan	52,000,000	3.10	112,208,000	4.85	112,208,000	4.85
Australia.....	16,683,000	2.43	(a)	(a)	1,953,000	0.27
New Zealand.....	23,087,000	14.41	23,087,000	14.13	23,087,000	14.13
Union of South Africa.....	352,713,000	36.00	634,457,000	60.30	710,360,000	67.51
Other countries.....	804,251,000	.....	(a)	(a)	(a)	(a)
Total.....	29,086,657,000	(b) 14.28	(c)	(c)	(c)	(c)

(a) Complete data omitted because of indefiniteness or unavailability.

(b) Population figures are principally supplied by United States Department of Commerce.

(c) Totals omitted due to the great number of instances in which data are not available.

(d) Includes Alaska, Hawaii and Puerto Rico.

(e) 1 ounce fine gold = \$35.

(f) Exclusive of gold held by Foreign Exchange Control Board.

NOTE: It is understood that material amounts of gold are not reported by several countries, such as amounts held in secret funds for stabilizing currencies and those hoarded or held outside of regularly reported stocks.

Table 48.—Average Commercial Ratio of Silver to Gold for each Specified Year Since 1700
(Supplied by United States Mint)

Year	Year	Year
1700.....	14.81	1905.....
1750.....	14.55	1910.....
1800.....	15.68	1915.....
1850.....	15.70	1920.....
1875.....	16.64	1925.....
1880.....	18.05	1930.....
1885.....	19.41	1932.....
1890.....	19.75	1933.....
1895.....	31.60	1934.....
1900.....	33.33	1935.....
		33.87
		38.22
		40.48
		20.28
		29.78
		53.74
		73.29
		59.06
		72.49
		54.19
		1936.....
		1937.....
		1938.....
		1939.....
		1940.....
		1941.....
		1942.....
		1943.....
		1944.....
		77.09
		77.44
		80.39
		88.84
		99.76
		99.73
		90.57
		77.67

ORDER-IN-COUNCIL P.C. 1008—FEBRUARY 15, 1945

WHEREAS subsection one of section twenty-five of the Bank of Canada Act, Chapter forty-three of the Statutes of Canada, 1934, provides that the Bank shall sell gold to any person who makes demand therefor at the head office of the Bank and tenders the purchase price in legal tender, but only in the form of bars containing approximately four hundred ounces of fine gold;

AND WHEREAS by Order in Council P.C. 1004 dated February 18, 1944, passed under the provisions of sub-section two of said section twenty-five of the said Act, the operation of said subsection one of section twenty-five was suspended for a period of one year from and after March 10, 1944,

NOW, THEREFORE, His Excellency the Governor General in Council, on the recommendation of the Minister of Finance and under the provisions of said subsection two of section twenty-five of the Bank of Canada Act is pleased to order that the operation of said subsection one of section twenty-five be and it is hereby suspended for a further period of one year from and after the tenth day of March, 1945, unless sooner rescinded by Order in Council.

ROYAL CANADIAN MINT

The Ottawa Mint, established as a branch of the Royal Mint under the (Imperial) Coinage Act, 1870, and opened up on January 2, 1908, was by 21-22 Geo. V, C. 48, constituted a branch of the Department of Finance and since December 1, 1931, has operated as the Royal Canadian Mint. The great development of the gold mining industry in Canada has resulted in gold refining becoming one of the principal activities of the Mint. Gold coins have never been a popular medium of exchange in Canada and have not been struck since 1919, most of the fine gold produced from the rough shipments from the mines being delivered to the Bank of Canada in the form of bars, the rest being sold in convenient form to manufacturers.

The domestic gold currency of Canada, as at present authorized by the Currency Act, consists of \$20, \$10, \$5 and \$2½ gold pieces, 900 millesimal fineness (only \$10 and \$5 have been issued). Gold was used only to an insignificant extent as a circulating medium in Canada, its monetary use being practically confined to reserves; \$5 and \$10 gold pieces weighing respectively 129 and 258 grains, 9/10ths pure gold by weight, have been coined, the Canadian gold dollar thus containing 23.22 grains of pure gold. The \$5, \$10 and \$20 gold coins of the United States, which contain exactly the same weight of gold as Canadian gold coins of these denominations, are legal tender for their face value only, as are the British sovereigns, which are legal tender for \$4.86 2/3, their equivalent in Canadian gold dollars.

The regulations in part for the receipt of gold bullion at the Royal Canadian Mint, Ottawa, are as follows: Each parcel of bullion for which a separate assay is required shall be regarded as a separate deposit, and no ingot exceeding 1,500 ounces troy, gross weight, will be accepted. All deposits shall be dealt with in the order in which they are received. Deposits containing, by assay, less than 200 parts of gold in 1,000 or appearing, either before or after melting and assaying, to be unsuitable for treatment by the refining process in use, may be rejected. A deposit so rejected shall be returned to the depositor on payment by him of any costs incurred for melting and assaying.

The Mint charges, to be calculated on the gross weight of the deposit after melting, shall be as follows:

(a) For melting and assaying—one dollar for the first four hundred ounces or part thereof and twenty-five cents for each additional one hundred ounces or part thereof.

(b) For refining—When the deposit contains not more than 5 per cent base metal, 3 cents the ounce.

Over 5 per cent but not over 10 per cent base metal 3½ cents the ounce.

Over 10 per cent but not over 15 per cent base metal, 4¼ cents the ounce.

Over 15 per cent but not over 20 per cent base metal, 5 cents the ounce.

On deposits which contain over 20 per cent base metal, or which require other treatment, a charge not exceeding 10 cents the ounce, to be determined by the cost of the treatment.

The minimum charge for refining shall be two dollars for each deposit and the charge for refining shall apply to all deposits containing by assay less than 995 parts fine gold in 1,000.

An additional handling charge at the rate of 35 cents the ounce fine, to cover costs of realization in a market outside Canada, shall be made on all newly mined Canadian gold deposited with the Mint, and this charge shall be increased to \$1.00 the ounce fine on all other gold accepted as a deposit.

The gross value of gold deposited for sale with the Royal Canadian Mint or the Dominion of Canada Assay Office, Vancouver, shall be the market price of gold in the country to which the Government is at the time of the receipt of the deposit exporting gold, converted into Canadian funds at the average of the buying rates of exchange of that country reported to the Department of Finance by the Bank of Canada at 11 a.m. daily during the week in which the gold is deposited with the Mint or Assay Office.

In addition to newly mined Canadian gold there may be accepted at the Mint, gold (over 1 ounce troy fine) in the following forms: old jewellery and dental scrap, provided it has not been melted or otherwise treated in any way to prevent its origin being readily recognized; scrap from manufacturers and refiners the result of processes carried out by them in the ordinary course of their business; gold coin which, when of full weight and fineness, is not legal tender in Canada. Satisfactory evidence as to the origin of the gold shall be furnished by the depositor if required.

Delivery of deposits shall be accepted at the Mint counter only, free of all charges, and when bullion is forwarded by mail or express the original packages will not ordinarily be opened until an invoice of the description and weight of their several contents has been received. When there is a serious discrepancy between the actual and the invoice weights of any deposit, further action in regard to it will be deferred pending communication with depositor.

The gross value of a deposit shall be calculated at a rate of one dollar for each 23.22 grains fine gold contained therein (equivalent to \$20.6718+ the ounce fine) and at a rate for all silver in excess of one per centum of the weight of the deposit after melting to be determined by the Minister of Finance. The rate to be paid, under Clause 4 of the Regulations, for silver in excess of one per centum of the weight of deposits received in any week, shall be the domestic price for silver for the basic period of September 15 to October 11, 1941, under the maximum price regulations of the Wartime Prices and Trade Board, namely 38.6 cents per ounce fine.

GOLD BULLION

Gold deposited at the Mint again showed a decrease, the receipts being the lowest since the year 1933. 3,857 deposits weighing 3,487,810 ounces gross were received from Canadian Mining Companies and sundry persons, and 96 deposits weighing 49,924 ounces gross were received from the Dominion of Canada Assay Office, Vancouver, B.C. The total gross weight of gold received at the Mint, including mutilated gold coin, was 3,537,734 ounces, containing by assay 2,862,048 ounces fine gold and 385,991 ounces fine silver. This shows a decrease as compared with the year 1943 of 1,037 in the number of deposits, gross weight 918,703 ounces, gold 754,910 ounces fine and silver 88,394 ounces fine.

The net amount paid by cheque to depositors was \$107,504,172.45. In addition 5,603.962 ounces of fine gold with a statutory value of \$115,844.59 were also issued in payment of gold deposits.

Postage collected for the Postmaster General on deposits shipped by mail, postage collect, amounted to \$13,165.36.

There were 577 gold deposits received at the Dominion of Canada Assay Office, Vancouver, B.C.

Details of the origin of the bullion deposited at Vancouver and Ottawa are shown in the following table.

Source	Gross Weight	Fine Gold	Fine Silver
	Ounces	Ounces	Ounces
From Canadian mines and refineries—			
Ontario.....	2,135,742.075	1,724,975.760	225,046.97
Quebec.....	1,073,876.275	880,766.502	120,627.19
British Columbia.....	135,588.080	109,626.768	19,824.86
Manitoba.....	103,842.375	84,301.336	6,297.93
Yukon.....	30,569.640	23,814.864	5,124.83
Nova Scotia.....	6,251.250	5,841.465	187.68
Northwest Territories.....	30,644.600	21,927.511	5,760.22
Alberta and Saskatchewan.....	79.315	57.322	5.05
Total from mines and refineries.....	3,516,593.610	2,851,311.528	382,874.73
From jewellery and scrap.....	20,200.410	9,456.454	2,784.56
Mutilated gold coin.....	0.236	0.213	
Grand Total.....	3,536,794.256	2,860,768.195	385,659.29

A detail of the fine gold issued in the form of trade bars to the Bank of Canada and granulated, sweep and medals to sundry persons is shown hereunder:

	Ounces Fine
6,858 Trade Bars to Bank of Canada.....	2,739,922.833
Depositors.....	5,603.962
Sales to Manufacturers.....	74,866.088
Medals.....	5.009
Sweep.....	9,357.108
	<u>2,829,755.000</u>

This total shows a decrease of 815,984.964 ounces fine as compared with the year 1943.

DOMINION OF CANADA ASSAY OFFICE, VANCOUVER, B.C.

The sum of \$1,436,665.86 was disbursed for the purchase of gold bullion deposited at this office during the calendar year 1944.

A statement of the origin, weights, etc., of the deposits received during 1944, and comparative statements for the years 1939 to 1944, inclusive, are shown hereunder.

Source	Number of Deposits	Gross Weight	Fine Gold	Fine Silver
		Ounces	Ounces	Ounces
Yukon Territory.....	207	30,569.64	23,814.864	5,124.83
British Columbia.....	253	15,360.93	12,486.271	2,015.01
Alberta and Saskatchewan.....	4	68.59	51.498	4.16
Jewellery and dental scrap.....	113	2,984.71	1,326.395	505.55
	577	48,983.87	37,679.028	7,649.55

THE TORONTO STOCK EXCHANGE

Price Action of Canadian Gold Mining Shares in 1944 and the First Six Months of 1945
(By J. B. WHITE, President, The Toronto Stock Exchange)

In common with the other war years, the trend of Canadian gold mining shares during 1944 and the first six months of 1945 continued to mirror exactly the progress of Allied arms in Europe. As depicted by the Toronto Stock Exchange gold index, the prices of gold shares moved hesitantly through the first few months of 1944 to jump sharply with the Allied invasion of Normandy in June in a move similar to that which had occurred with the invasion of North Africa in the late autumn of 1942.

From June on, the trend was progressively higher with the sweep to the Rhine, the monthly average index figure mounting from 100.89 to a high of 112.35, only to break sharply in December to 107.88 when Von Runstedt mounted his abortive offensive on the American lines. His subsequent defeat was portrayed in the index by an average gain of some five points in the January figures, and steadily advancing monthly prices, culminating in the Third Reich's capitulation in May, to 126.40. June's average monthly price, the highest the Exchange's index had been since 1937, was 127.64 and contrasted with a low during the war years of 53.15, the month before the landing in North Africa in 1942.

The following table gives the monthly averages of the Toronto Stock Exchange gold index for the period under review and also since 1939.

Table 49.—Monthly Average During War Period of Toronto Stock Exchange Gold Index, 1939-1945

Month	1939	1940	1941	1942	1943	1944	1945
January.....		120.59	107.30	81.52	73.88	103.55	112.29
February.....		117.50	99.97	74.14	78.17	103.98	119.93
March.....		111.99	100.58	67.99	80.20	101.93	118.84
April.....		110.33	99.35	62.84	83.59	101.57	118.63
May.....		94.51	96.58	64.14	82.10	110.89	126.40
June.....		80.19	97.80	69.39	83.97	104.53	127.64
July.....		83.19	101.12	63.29	98.20	112.28	.....
August.....		89.78	101.09	60.07	94.51	111.94	.....
September.....		104.07	97.10	59.51	99.65	112.35	.....
October.....		110.47	101.22	96.55	53.15	97.19	110.45
November.....		116.04	107.53	90.10	60.77	96.00	110.41
December.....		118.30	107.59	84.95	65.45	96.98	107.88

As with the trend, volume in gold shares on the Toronto Stock Exchange followed the vicissitudes of the war during the past eighteen months. Trading totals show 167,127,391 shares for 1944, the months contributing most being those of June to September. It must be pointed out that the trading figures used represent all stocks traded, and not the golds alone, since the latter are not segregated as such in Toronto Stock Exchange share totals. Nevertheless, the total figures give a good indication of the volume in the golds because of the dominance of this type of stock in Exchange share transactions.

Similarly, the share totals for the first six months of 1945 also show the influence of war. April's turnover was 74 million shares, topping the previous high made in March of 1934 of 67 millions, and higher than all of 1942 or 1941. May's volume was on a like scale and helped to lift the half year's figures to 263,023,860 which is more than double that of the whole of the 1944 and more than seven times that of the whole of 1942.

Table 50.—Volume of Trading on the Toronto Stock Exchange, 1939-1945

Year	First Six Months (January-June)	Entire Year (Twelve Months)
1939.....	68,313,702	113,995,569
1940.....	45,113,229	70,748,529
1941.....	23,880,909	51,145,467
1942.....	19,089,607	36,870,992
1943.....	50,820,393	109,702,365
1944.....	94,990,636	172,234,102
1945.....	240,046,947	.....

GOLD LISTINGS ON THE TORONTO STOCK EXCHANGE

A significant factor evincing the increased public awareness of gold mining is found in the number of new gold issues listed on the Exchange during 1944 and the first half of 1945. In this period 44 new gold companies applied for listing privileges and were subsequently approved by the listing committee of the Exchange. The new companies, although mostly of the Yellowknife area, represented every mining camp in the Dominion and comprised such issues as Frobisher, East Sullivan, Campbell, Red Lake, Hosco, Heva, Aubelle, Giant Yellowknife, Harricana, Eldona, Donalds, Lexindin and Louvicourt.

The following table gives the aggregate number of outstanding shares of all gold mining companies (seniors, juniors and gold prospects) listed on the Toronto Stock Exchange, together with the total market valuation at the end of each month. Total listed gold mining companies is also given as well as the total number and valuation of all companies listed.

Table 51.

Year	Total Gold Shares Issued	Quoted Market Values	Number of Issues	Total Value of all Stocks	Total Number of Issues
1944					
January.....	318,263,925	563,220,541	111	4,564,334,002	550
February.....	318,476,925	539,398,848	111	4,529,640,824	553
March.....	323,728,368	541,599,969	113	4,458,375,582	554
April.....	328,639,379	576,057,275	114	4,688,297,448	574
May.....	333,530,618	594,736,772	116	4,817,744,490	577
June.....	342,960,228	658,230,456	121	5,289,786,361	583
July.....	347,866,154	676,328,268	123	5,290,180,741	591
August.....	345,271,213	671,991,392	122	5,303,515,070	592
September.....	351,796,223	661,790,717	125	5,244,515,763	599
October.....	352,580,223	639,988,615	125	5,220,804,543	599
November.....	352,955,223	647,741,818	125	5,243,410,083	601
December.....	355,628,228	652,830,904	126	5,376,505,274	604
1945					
January.....	361,588,238	739,793,609	128	5,555,196,676	605
February.....	368,308,248	774,857,585	131	5,881,827,660	608
March.....	385,637,446	745,828,934	137	5,772,564,233	616
April.....	398,809,333	831,481,576	142	6,020,365,398	621
May.....	420,461,812	841,424,188	150	6,139,403,004	632
June.....	445,234,680	873,870,252	162	6,365,934,969	646

THE ALLUVIAL GOLD MINING INDUSTRY, 1944

In 1944, and for many years past, the greater part of the Canadian production of alluvial gold came from the Yukon Territory and British Columbia; relatively small quantities are also obtained in Alberta, Saskatchewan, and sometimes Quebec.

During the year under review there were 33,274 troy ounces of fine gold recovered from crude gold obtained in Canadian alluvial mining operations. This represents a decrease of 37 per cent from the corresponding output in 1943 and 70 per cent from that of 1942. These decreases reflect the increasing scarcity of experienced men available for mining operations and prospecting.

Quebec and Ontario.—No placer gold mining operations were reported during 1943 and 1944 from either Quebec or Ontario.

Saskatchewan and Alberta.—Placer gold has been mined along the North Saskatchewan River at various points between Rocky Mountain House, Alberta, and Prince Albert, Saskatchewan, from about 1860. Most activity has, however, been confined to the Alberta region, particularly in the vicinity of Edmonton. During 1944 receipts of gold, considered as being placer in origin, at the Vancouver assay office, and the Royal Canadian Mint, Ottawa, included 51 fine ounces from Alberta and 5 ounces from Saskatchewan. The exact locations from which this metal came are not known.

British Columbia.—It has been found impractical to obtain complete reports for each individual placer gold mining operation in British Columbia inasmuch as a considerable quantity

of the crude placer gold is recovered annually by prospectors of no fixed abode who, in many instances, market their recoveries through local merchants and banks. Recoveries in 1944 were made chiefly from deposits located in the Atlin and Cariboo districts; other districts to report production included Kamloops, Quesnel, Fort Steele, Revelstoke, Vancouver Island and Clinton. It was estimated that 9,402 troy ounces of fine gold were recovered from crude alluvial gold produced in British Columbia during 1944.

REVIEW OF PLACER MINING ACTIVITIES IN THE YUKON TERRITORY DURING THE YEAR 1944

(Department of Mines and Resources)

In the Dawson District the extent of mining operations was dependent entirely on man power available, and the situation in this respect was even worse than in 1943.

The Yukon Consolidated Gold Corporation, Limited, operated three dredges throughout the season, namely, No. 3 on Hydraulic Lease No. 18 in the Klondike River valley; No. 4 on Bonanza Creek, and No. 7 on Quartz Creek. Dredge No. 7 was closed down for a few weeks during the summer and the crew was put on No. 10 on Middle Dominion Creek, and this dredge was operated for a time until it was moved into a safer harborage. In 1943 five dredges were operated, No. 10, and No. 11 on Hunker Creek being the other two operated in 1943.

Sufficient labour was available in addition to the three dredge crews to operate stripping plants on Middle Dominion Creek, on Hunker Creek, and on Quartz Creek.

The Hydro-electric power plant was operated throughout the whole year, as well as the machine shop at the Bear Creek camp.

The season was very favourable for mining, and there was an ample supply of water, more than in ordinary years.

Clear Creek Placers, Limited, operated a dredge on the Left Fork of Clear Creek for a full season, with excellent results. Scarcity of labour prevented further expansion of operations of this company in the Clear Creek area.

Mining operations were carried on by individual miners on Bonanza, Quartz, Hunker, Last Chance, Gold Bottom, Dominion, Gold Run and Eldorado Creeks, and on Glacier and Miller Creeks. Hydraulic operations were carried on by Osborn and Colbourne on Bonanza Creek, Bremner and Franich and Wilson and Townshend on Last Chance Creek, Medby and Sembsmoen on Miller Creek, and W. A. Williams on Glacier Creek.

In the Mayo Mining District placer mining was continued on Dublin Gulch by O. Lunde, and on Hight Creek by E. Middlecoff.

In the Whitehorse District, B. Beloud and associates who have placer property on Bates and Iron Creeks put in a tote road from the Haines Highway Cut-off to Mush Lake. The Territorial Council contributed \$2,500 towards the cost of this.

Placer gold production, as reflected in royalty export tax returns for the calendar year 1944, was as follows:

Dawson district.....	29,092.29 ounces
Mayo district.....	272.00 "
Whitehorse district.....	178.71 "
Total.....	29,543.00 "

The Government Regulation permitting the renewal of placer claims and prospecting leases by payment of fees only, and without representation work, resulted in practically all ground held in 1943 being renewed during 1944. There was great activity in the staking of claims and prospecting leases during 1944. Two hundred and sixty-nine and one-half miles of ground on creeks and rivers were located in prospecting leases and for which grants were issued. In addition,

renewal prospecting grants were issued for fifty miles, making a total of three hundred and nineteen and one-half miles of creeks and valleys held under prospecting grants. This was divided as to districts as follows:

Dawson Mining District.....	254½ miles
Whitehorse Mining District.....	53 "
Mayo Mining District.....	12 "

Ground held under placer claim grants was as follows:

Dawson Mining District.....	1,750 claims
Whitehorse Mining District.....	57 "
Mayo Mining District.....	78 "
Total.....	1,885 "

Of this total 164 were new locations, 121 of these being in the Dawson District, 39 in the Whitehorse District, and 4 in the Mayo District.

During 1944 the Numalake Mines, Limited, of Toronto, Ontario, carried on prospecting and development operations on Scroggie Creek with a small crew. Over one hundred miles of prospecting leases have been acquired by this Company, and it is anticipated that if labour conditions improve and equipment can be secured, prospecting on a much larger scale will be carried on in 1945.

Clear Creek Placers, Limited, and its allied company the Yukon Alluvial Golds, Limited, have acquired considerable mileage of new ground under leases. In post war years they are planning a rather ambitious development program in Yukon Territory. During 1944 they optioned large areas on Matson, Thistle, Barker and Rosebute Creeks. At the present time a crew is on Matson Creek putting down twenty or thirty prospecting shafts, and if the results are sufficiently encouraging a drill and equipment will be put in this inaccessible area for prospecting purposes. Drilling operations are planned on Thistle Creek to start in May or June, 1945, if men are available for a prospecting crew. A drill will also be placed on Barker Creek during the summer of 1945 for prospecting purposes.

There appears to be a greater interest in prospecting with modern equipment on many old time placer creeks which have been prospected or worked to a very limited extend in the past

Table 52.—Summary Statistics of Alluvial Gold Mining in Canada, 1943 and 1944

	1943			1944		
	British Columbia (d)	Yukon (e)	Alberta (a)	British Columbia (d)	Yukon (e)	Alberta and Saskatchewan (a)
Number of firms and individual operators (†)....	39	4	.....	41	6	.....
Capital employed..... \$	631,157	10,741,692	.....	(g) 72	(g) 139	(g)
Number of employees.....	62	175	.....	72	139	.....
Salaries and wages paid..... \$	101,119	545,164	.....	116,132	482,424	.....
Electricity generated for own use..... K.W.H.	260,000	10,695,900	.....	260,000	12,698,500	.....
Electricity generated for sale.....	.....	4,301,788	.....	.....	5,498,700	.....
Crude gold recovered..... crude oz.	14,600	52,710	22	11,433	30,570	66
Platinum recovered..... oz.	7	.....	.....	.....	.....	.....
Value of platinum recovered..... \$	269	.....	.....	.....	.....	.....
Quantity of material handled (f)..... cu. yd.	754,202	7,273,915	.....	531,737	4,687,174	220
Tungsten recovered (pounds concts.)..... lb.	.....	12,083	.....	.....	.....	.....
Length of ditches..... miles (b)	53	50	.....	47	50	.....
Total gross value of alluvial products..... \$	451,000	1,598,164	808	361,977	916,877	2,271
Fuel and electricity used (purchased)..... \$	8,288	43,811	.....	8,470	35,121	.....
Process supplies used..... \$	4,441	50,952	.....	7,368	6,355	.....
Cost of freight and express on dust, nuggets, bullion, etc., shipped (c)..... \$	829	30,742	.....	1,140	15,787	.....
Cost of smelter, refinery and mint treatment on material shipped (c)..... \$	2,240	16,455	.....	1,464	8,419	.....
Total net value of alluvial products..... \$	435,202	1,456,204	808	343,535	851,215	2,271

(a) Recoveries for Alberta and Saskatchewan represent receipts of crude gold from Alberta and Saskatchewan at the Dominion Assay Office, Vancouver, B.C., or Royal Canadian Mint, Ottawa, Ont. No other statistics available.

(b) Includes flume; in use.

(c) Information not completely available.

(d) Value of crude gold in Canadian funds in 1944 was estimated to be \$31.66 per crude ounce. In 1943 it was \$30.87.

(e) Value of crude gold in Canadian funds in 1944 was estimated to be \$29.99 per crude ounce. In 1943 it was \$30.10.

(f) Includes some overburden or barren material. Partly conjectural.

(g) Not compiled or recorded in 1944.

(†) In addition to the number shown in the table, there were numerous small operators from whom returns were not obtainable; subject to revision.

Table 53.—Alluvial Gold Recovered and Quantity of Material Handled (†), 1925-1944

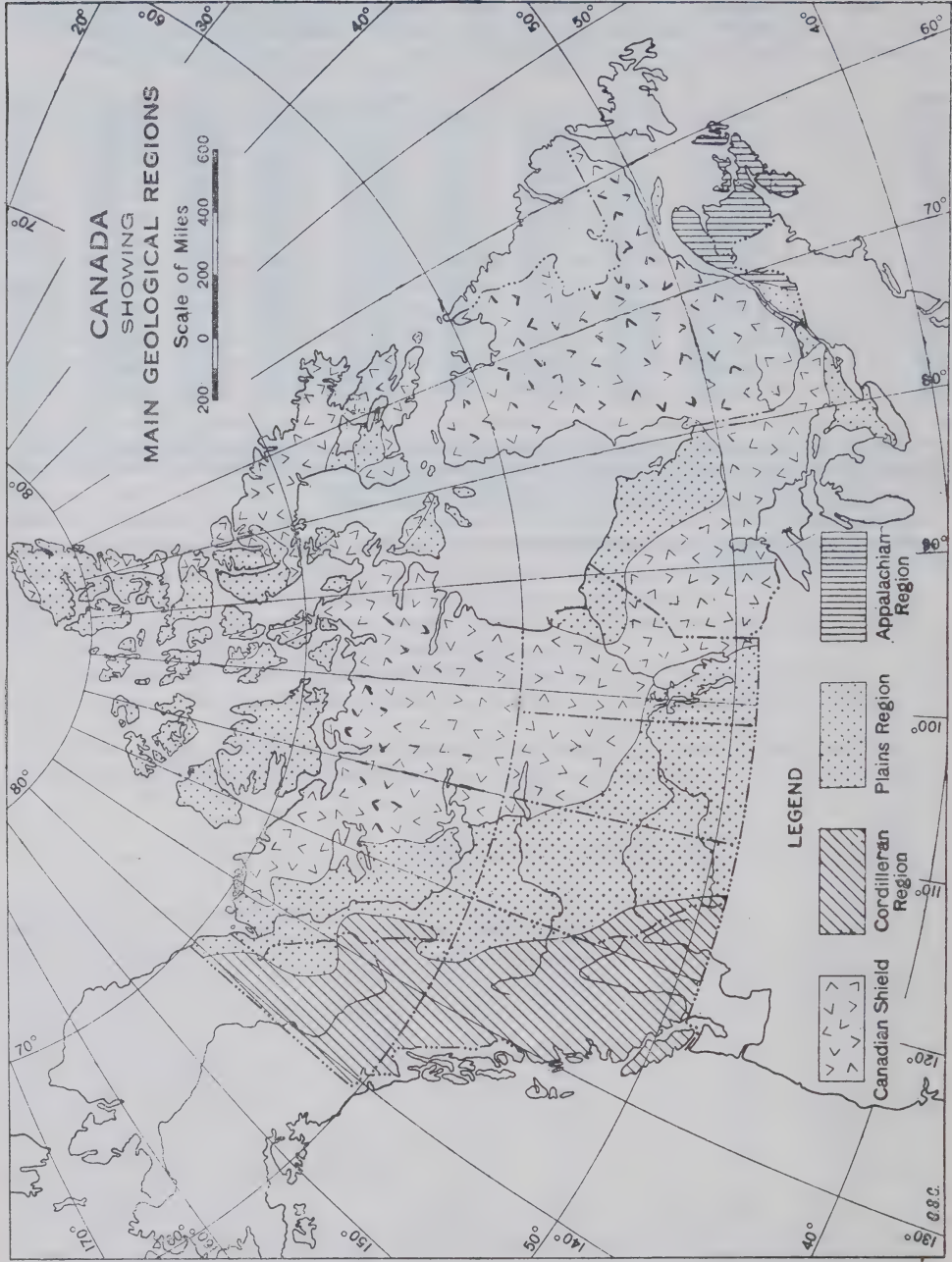
Year	BRITISH COLUMBIA				YUKON				Average value gold per fine oz.
	Material handled (*)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	Material handled (*)	Gold recovered	Ounces per cu. yd.	Value per cu. yd.	
	cu. yd.	fine oz.	fine oz.	\$	cu. yd.	fine oz.	fine oz.	\$	\$
1925.....	(a)	13,181	(a)	.....	3,103,892	47,817	0-0154	0-318	20-67
1926.....	1,237,090	16,730	0-0135	0-279	2,501,200	25,344	0-0101	0-208	20-67
1927.....	2,470,552	7,353	0-0029	0-0599	2,421,489	30,778	0-0127	0-262	20-67
1928.....	1,188,667	6,739	0-0057	0-1178	5,097,182	34,116	0-0067	0-1385	20-67
1929.....	1,336,390	5,158	0-0039	0-0806	4,500,000	35,678	0-0079	0-1633	20-67
1930.....	224,339	7,164	0-0319	0-6593	3,559,642	35,160	0-0099	0-2046	20-67
1931.....	1,587,271	13,741	0-0086	0-1853	4,914,638	44,061	0-0090	0-1939	21-55
1932.....	1,053,677	16,320	0-0155	0-3637	6,051,256	40,373	0-0087	0-1572	23-47
1933.....	1,326,721	19,142	0-0144	0-4118	5,605,522	39,174	0-0070	0-2002	28-60
1934.....	2,034,522	20,145	0-0099	0-3415	6,315,070	38,703	0-0061	0-2104	34-50
1935.....	1,855,937	24,744	0-0133	0-4680	5,442,861	35,705	0-0066	0-2322	35-19
1936.....	2,083,934	34,711	0-0166	0-5815	8,087,159	50,192	0-0062	0-2172	35-03
1937.....	3,472,025	43,322	0-0125	0-4373	8,298,514	46,679	0-0056	0-1959	34-99
1938.....	4,138,746	46,207	0-0112	0-3939	8,870,628	71,303	0-0080	0-2813	35-17
1939.....	4,779,407	39,797	0-0083	0-2999	11,152,198	85,572	0-0077	0-2782	36-14
1940.....	6,680,457	32,128	0-0048	0-1848	11,551,170	79,905	0-0069	0-2656	38-50
1941.....	4,587,103	35,020	0-0076	0-2926	8,792,220	70,847	0-0081	0-3119	38-50
1942.....	1,884,887	26,323	0-0139	0-5352	11,875,833 (b)	83,198	0-0070	0-2695	38-50
1943.....	754,202	11,680	0-0156	0-6006	8-028,117 (b)	41,157	0-0051	0-1964	38-50
1944.....	531,737	9,402	0-0177	0-6815	4,687,174 (b)	23,816	0-0050	0-1956	38-50

(†) In addition, relatively small amounts of alluvial gold have been recovered in Quebec, Saskatchewan and Alberta but complete data are not available; also, data relating to material handled, particularly those pertaining to small operations, are not complete and necessitate estimates in order to obtain totals.

(*) Data partly conjectural and include some overburden and barren material.

(a) Not available.

(b) Fine gold received at Royal Canadian Mint (Vancouver Assay Office); previous year's figures represent estimated fine gold in crude gold recovered.



THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA, 1944

The great part of the gold of Canada comes from the Canadian Shield, an immense area of precambrian rocks extending from the Labrador Coast westward almost to the mouth of the MacKenzie River. The area of the shield is roughly 1,825,000 square miles, almost half of Canada. The deposits of the shield are of two main types, namely, quartz veins, from which most of the gold, up to the present time, has been won, and sulphide deposits which produce a smaller but very considerable proportion. The second great source of gold in Canada has been the Western or Cordilleran section, comprising British Columbia and Yukon Territory—the gold production from this section includes relatively large quantities obtained from alluvial deposits. The third principal area in which gold deposits occur is the Acadian region of Eastern Canada, the metal occurring principally in Nova Scotia where it has been mined since 1862.

Lode gold deposits like most metalliferous ore deposits are very closely linked in origin and place with geological formations of certain ages and types. In broad outline these relationships are known and easily understood, but because geological information is very incomplete for Canada—less than a fifth of Canada has been studied in any adequate manner—it is not yet possible to indicate the location of more than a part of the ground that is favourable for the occurrence of metallic ore deposits.

Geological explorations extending far beyond ground that has been geologically mapped provide general information and permits the delineation of broad features relating to ore deposition. In mapped areas much more detailed information of like type is available. Knowledge of the relationship between geology and ore deposition is of the greatest importance because it guides the search for new deposits.

Canada is divisible broadly into four large regions, each having its own characteristic stratigraphy and structure. These are from west to east: (1) the Cordilleran region embracing most of British Columbia and Yukon, (2) the Plains region forming a broad belt east of the Cordillera, (3) the Canadian Shield extending east to the St. Lawrence and (4) the Appalachian region embracing southeastern Quebec and the Maritime Provinces. A description of these regions, by George Hanson, Ph.D., Chief Geologist of the Geological Survey, Ottawa, appeared in the Dominion Bureau of Statistics' Annual Mining Report for 1943.

In 1944 mining operations were conducted at 262 auriferous quartz mines compared with 156 in 1943. The number of producing properties totalled 85 during the year under review as against 135 in the preceding year and 33 in 1923. From official returns received, it was estimated that 6 of the more important gold mines ceased or suspended regular production in 1944 compared with 22 in 1943.

The gross value of output of the entire auriferous quartz mining industry, including the value of all recoverable metals, gold, silver, etc., totalled \$94,263,416 in 1944 compared with \$116,833,847 in 1943. Of the 1944 total, \$64,870,440 represented recoveries from Ontario ores, \$20,179,341 from Quebec ores and \$6,627,114 from the gold mines of British Columbia.

Employees in the lode gold mining industry totalled 17,226 compared with 19,038 in 1943 and 5,524 in 1923. Salaries and wages paid amounted to \$37,023,505 against \$40,665,283 in the preceding year. Fuel and purchased electricity consumed by the industry in 1944 totalled \$5,895,117 and the cost of explosives, drill steel and other process supplies used amounted to \$11,174,746. A total of \$10,084,691 was paid in 1944 by operating Canadian gold mining companies in Government taxes and \$1,319,620 expended for prospecting and preliminary exploration of new areas or deposits.

BUREAU OF MINES, OTTAWA, EQUIPPED TO SERVE CANADA'S GOLD INDUSTRY

(Bureau of Mines, Ottawa, Canada)

After three years of declining production, the results of conditions arising from the war, the outlook for Canada's gold industry is improving. The recent lifting of restrictions on development work has largely cleared the way for an expansion of activities, though it will

probably be several months before sufficient labour and supplies become available to enable the industry to greatly extend its operations. Aside from the producing mines, attention has been centred chiefly on exploratory work which has been exceptionally active during the past year or more, especially in Quebec, Manitoba and the Northwest Territories. From the results of this work to date it is apparent that many properties will be added to the list of producers in due course, on some of which large deposits have been disclosed. Also, as conditions improve, operations at producing properties will be expanded. These operations were, in many cases, greatly curtailed owing to war conditions, and at some mines production was discontinued. Thus the stage appears to be set for a steady enlargement of the industry's activities, with the likelihood that its past achievements will eventually be matched, or even surpassed. There is still considerable ground to be regained, however, as is evident from the fact that gold production has decreased in value from a peak of \$205,789,392 in 1941 to \$112,532,073 in 1944. Returns for the first five months of 1945 show also that production was appreciably lower than in the corresponding period of 1944.

The anticipated expansion in the industry is of special interest to the Bureau of Mines in Ottawa, for if past experience can be used as a guide, the facilities of its Ore Dressing and Extractive Metallurgy Laboratories will be used to work out treatment processes for most of the milling plants that come into operation. Prior to 1941, by far the greater part of the work in the Laboratories was on gold ores from mining areas throughout the Dominion. Gold production had been increasing steadily and for several years in succession the annual value of gold output exceeded that of all the other metals. From 20 to 30 milling plants were entering production each year, and even though additions had been made to its facilities, the Bureau found it difficult at times to handle the many requests for test work on gold ores. To an increasing extent the ores received were refractory, containing either arsenopyrite or pyrite, and frequently such ores require roasting to liberate the gold. Even then the gold recovery is often in the neighbourhood of 90 per cent, compared with recoveries of 95 per cent or higher in the case of ores free of arsenic and pyrite.

Ores from several of the gold prospects which have been receiving active exploratory attention are known to be refractory to a varying degree and thus the experience gained by the Bureau in working out treatment methods for these types of ores will be of particular advantage. For its work on gold and other metallic ores, the Bureau has all the necessary equipment for small and large-scale tests, and the layout allows for flexibility in the devising of flow sheets. For large-scale work the equipment includes a sampling plant with a capacity of four tons an hour; two large grinding units with classifiers; three batteries of flotation machines; small ball mill units for use in grinding middlings; a gravity concentrative section with a full deck Wilfley table and three tables of quarter deck size; a pair of jigs; magnetic concentrating equipment, comprising various types of high and low intensity separators; a sink-and-float pilot plant; a precipitating unit; and a small cyanide plant with four agitators and thickeners and drum type filter and accessories. Fully equipped laboratories are also maintained for assay, chemical, microscopic and spectroscopic analyses.

Samples of ores from a few hundred pounds to 50 tons or more are accepted for investigative work, and a staff of engineers undertakes the development of the most economic method of treatment, and prepare a report detailing the results that may be anticipated and a flow sheet by which such results may be attained. The samples originate from prospectors; prospecting and mining syndicates; the mining companies that develop the properties to a stage where a milling plant is erected; consulting engineers; contractors who design and erect the plants; and operating companies who may be experiencing difficulties in their extraction methods, or who are endeavouring to improve their methods of treatment.

Conditions governing the shipment and acceptance of samples of ores, minerals and metallurgical products for examination and test are as given below.

The application should state the exact location of the property from which the sample was taken and the nature of the test work desired.

Samples should be representative of the grade and character of the ore that it is proposed to treat. According to the nature and scale of the tests desired, the size of the sample should be within the following ranges:

1. For examination and identification of the mineral constituents only—from a few pounds up to 100 pounds.
2. For examination and preliminary tests—100 pounds to 1,000 pounds.
3. For examination, preliminary tests, and for small-scale continuous tests—2 to 5 tons.
4. For large-scale continuous tests on tonnage check basis—5 tons to carload lots.

All samples under two tons in weight must be bagged and properly tagged. Two tons or over may be shipped in bulk if desired.

All transportation charges must be paid by the shipper. These charges must be prepaid, except on shipments from points where there is no Agent, in which case the Bureau of Mines will pay and will bill the shipper for the amount. No examination or test work will be made until reimbursement of such payment is made.

In addition to the transportation charges, the shipper of bulk or tonnage samples intended for analysis only, must pay a fee based on the size of the bulk sample and on the elements determined. This fee is payable in advance of submittal of the report of the analysis.

Information regarding the results of any work undertaken in the Laboratories, whether contained in a report or in related correspondence shall not be used as publicity or advertising matter for the sale of shares in any promotion.

Shipments should be addressed to "The Ore Dressing and Extractive Metallurgy Laboratories, Bureau of Mines, 552 Booth Street, Ottawa, Canada".

Co-operation of the shipper's representative and consulting engineers in doing the test work is welcomed, and in this connection it may be noted that the facilities of the Laboratories have been used at various times by several mining companies in working out some particular problem or process, using their own staff, with the guidance of the Bureau's engineers.

Although research and investigative work in ore dressing and extractive metallurgy has been left mainly with the Dominion Government, the provinces of British Columbia, Ontario, Quebec, and Nova Scotia have separately established less pretentious laboratories that have been of noticeable assistance to the mineral industries in the respective provinces. The other provinces, where mining is on a smaller scale, have no special laboratory facilities for such work, except in some respects through provincial assistance to university laboratories.

In British Columbia, the Metals and Minerals Division of the British Columbia Industrial and Scientific Research Council is carrying on the work of the British Columbia War Metals Research Board which ceased to function at the close of 1944. Its laboratory is housed in the Mining Building of the University of British Columbia and will be available to render useful service within the Province to the mineral industry.

In Ontario, the Ontario Research Foundation in Toronto does a very limited amount of ore dressing work, but does considerable work on other metallurgical problems, the Foundation is almost self-sustaining by means of service charges from industry. The Ontario Department of Mines provides an assay and mineral identification service to prospectors free of charge or at nominal cost.

The Province of Quebec provides a service through its Department of Mines to prospectors by maintaining well equipped chemical, assay, spectrographic, and mineralogical laboratories. The Province has supplied certain universities with ore dressing and metallurgical equipment. For instance, the Laval University Laboratories have been equipped with modern testing facilities.

In Nova Scotia, the Provincial Government has provided the Nova Scotia Technical College with small-scale equipment for test work in ore dressing.

The Bureau of Mines in Ottawa co-operates fully with all the provinces by supplying any information desired and by supplying the provincial departments concerned copies of all reports on investigations on ores originating in the respective provinces.

Table 54.—Principal Statistics of the Auriferous Quartz Mining Industry in Canada, for Years Specified

	Number of active operators	(c) Number of operating plants or mines	Capital employed	Number of employees	Salaries and wages	Cost of fuel and electricity	(b) Cost of process supplies used	Amount of freight, etc., paid on shipments of ore, slag, etc.	Smelter and refinery treatment costs	Gross value of bullion, ore, concentrates or residues shipped from mines (d)	Net value of bullion, ore, concentrates or residues shipped from mines (d)
			\$		\$	\$	\$	\$	\$	\$	\$
1923.....	65	65	77,574,976	5,524	8,901,434	1,497,197	Data not available	Data not available	(a) 25,021,837	Data not available	
1929.....	80	85	135,166,105	8,660	14,258,733	2,579,481	Data not available	Data not available	(a) 37,275,986	Data not available	
1943—											
Nova Scotia.....	3	3	102,454	77	100,311	29,965	32,644	740	1,500	181,696	116,847
Quebec.....	41	46	36,743,065	4,730	9,742,932	1,591,293	3,718,472	96,817	493,168	24,088,645	18,188,895
Ontario.....	55	55	153,377,816	12,330	26,726,377	4,108,768	8,005,040	205,794	843,463	79,799,131	66,636,066
Manitoba.....	7	7	4,950,511	283	634,166	127,408	197,163	5,277	26,223	2,400,287	2,044,406
Saskatchewan.....	1	1	9,700				80				
British Columbia.....	40	40	14,511,081	1,272	2,736,093	381,383	680,405	139,334	231,331	8,094,301	6,661,848
Northwest Territories.....	4	4	2,981,352	346	725,404	149,052	139,846	5,758	25,213	2,269,633	1,940,764
Yukon.....											
Canada.....	151	156	212,675,979	19,038	40,665,283	6,337,869	12,773,650	453,720	1,620,898	116,833,847	95,597,710
1944—											
Nova Scotia.....	3	3	(f)	72	100,670	29,710	29,970	352	2,138	218,420	156,250
Quebec.....	144	146	(f)	4,516	9,302,580	1,537,531	2,986,898	83,945	530,613	20,179,341	15,020,363
Ontario.....	75	76	(f)	11,119	24,452,204	3,838,979	7,343,078	101,730	773,600	64,870,440	52,813,083
Manitoba.....	1	1	(f)	180	372,871	97,459	125,465	3,329	17,520	1,568,175	1,324,402
Saskatchewan.....	1	1	(f)	20	31,603	4,795	1,662				
British Columbia.....	21	23	(f)	1,241	2,542,570	306,196	585,135	182,045	253,839	6,627,114	5,290,898
Northwest Territories.....	12	12	(f)	78	221,007	60,447	102,538	1,671	8,385	799,926	626,865
Yukon.....			(f)								
Canada.....	257	262	(f)	17,226	37,023,505	5,895,117	11,174,746	373,074	1,586,095	94,263,416	75,234,384

(a) Less freight and treatment charges.

(b) Explosives, chemicals, etc.

(c) Number of mines producing: 1923—33; 1929—38; 1937—189; 1938—226; 1939—232; 1940—278; 1941—255; 1942—184; 1943—135; 1944—85.

(d) Value of bullion produced plus value of ore, concentrates, etc., shipped.

(e) Includes \$6,088,392 in salaries in 1943 and \$5,871,597 in 1944.

(f) Not recorded in 1944.

NOTE.—Net value represents the gross value less the cost of fuel and electricity, process supplies treatment changes and freight.

Table 55.—Principal Statistics Relating to Producers Only in the Auriferous Quartz Mining Industry in Canada, 1944

Province	Number of producing plants or mines	Capital employed \$	Number of employees	Salaries and wages \$	Cost of fuel and electricity \$	(a) Cost of process and supplies used \$	Value of freight paid on shipments of ore, slag, etc. \$	(b) Smelter and refinery treatment costs \$	Gross value of bullion, ore, concen- trates or residues shipped from mines (c) \$	Net value of bullion, ore, concen- trates or residues shipped from mines (f) \$
Nova Scotia.....	2	(e)	70	98,122	29,710	29,970	352	2,138	218,420	156,250
Quebec.....	21	(e)	4,159	8,795,121	1,550,597	2,977,725	83,946	530,613	20,179,341	15,036,460
Ontario.....	43	(e)	10,935	24,205,540	3,807,970	7,298,532	101,730	773,600	64,870,440	52,888,608
Manitoba.....	1	(e)	180	372,871	97,459	125,465	3,329	17,520	1,568,175	1,324,402
Saskatchewan.....										
British Columbia.....	17	(e)	1,198	2,482,044	304,930	585,035	182,046	253,839	6,627,114	5,301,264
Northwest Territories.....	1	(e)	65	200,293	60,240	102,513	1,671	8,385	799,926	627,117
Yukon.....										
Total Canada 1944.....	85	(e)	16,657	(d) 36,153,991	5,850,906	11,119,240	373,074	1,586,095	94,263,416	75,334,101
Total Canada 1943.....	135	211,116,754	18,933	(d) 40,485,008	6,385,117	12,762,116	453,720	1,620,898	116,833,817	95,611,966
Total Canada 1942.....	184	241,770,145	25,814	(d) 54,033,613	7,570,656	17,880,267	741,329	2,346,261	160,564,783	132,026,267
Total Canada 1941.....	255	231,635,873	31,850	61,063,035	8,336,180	20,721,498	916,323	2,678,508	179,103,182	146,450,673
Total Canada 1940.....	278	230,719,341	30,353	53,560,838	7,935,193	20,390,754	691,649	2,486,587	178,794,078	147,289,865
Total Canada 1939.....	232	214,326,069	29,001	50,891,920	7,701,026	19,001,782	694,165	2,249,312	160,014,172	130,367,887

(a) Explosives, etc.

(b) Includes handling charges.

(c) Value of bullion produced plus value of ore, concentrates, etc., shipped.

(d) Includes \$5,560,946 in salaries in 1944, \$6,051,901 in 1943 and \$6,878,390 in 1942.

(e) Not recorded in 1944.

(f) Gross value less cost of fuel, process supplies, freight and treatment charges.

Table 56.—Ores Mined and Milled, Crude Bullion Recovered and Crude Bullion and Concentrates Shipped in the Auriferous Quartz Mining Industry, 1944

	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories	Yukon	Canada
Number of producing mines.....	2	21	43	1	420	17	1	..	85
Ore mined..... ton	15,563	3,270,889	6,944,512	140,085	..	397,014	22,007	..	10,790,495
Material discarded (sorted)..... ton	..	87,549	135,519	..	..	8,416	..	..	234,820
Ore milled (ground, etc.)..... ton	15,563	2,962,578	6,800,568	140,085	..	393,206	18,869	..	10,330,899
Tailings retreated..... ton	..	2,500	15,732	..	..	..	..	..	18,232
Gold content of ores, slags, residues and concentrates shipped (*)—	..	..	..	..	..	..	..	..	..
To foreign smelters..... fine oz.	..	..	19,302	..	..	..	..	..	90,188
Canadian smelters..... fine oz.	..	37,001	2,004	..	..	..	..	..	40,293
Bullion bars shipped—	..	..	..	..	..	..	..	..	..
Gold content..... fine oz.	5,738	482,166	1,642,236	40,668	..	99,754	20,723	..	2,291,285
Silver content..... fine oz.	184	121,127	278,567	6,306	..	17,684	5,420	..	429,288
Bullion produced by amalgamation..... crude oz.	6,044	42,350	151,069	4,374	..	74,933	12,319	..	291,139
Bullion produced by cyanidation..... crude oz.	..	609,037	1,892,131	55,813	..	43,221	16,506	..	2,616,768
Total Bullion Produced..... crude oz.	6,044	651,387	2,043,200	60,187	..	118,204	28,825	..	2,907,847
Content of bullion bars produced—	..	..	..	..	..	..	..	..	..
Gold..... fine oz.	5,738	480,644	1,654,734	40,668	..	97,583	20,723	..	2,300,090
Silver..... fine oz.	184	121,136	274,423	6,307	..	17,696	5,420	..	429,166
Gold value (standard)..... \$	117,234	9,935,793	34,206,501	840,694	..	2,017,249	428,381	..	47,545,552
Silver value..... \$	71	52,088	108,809	2,434	..	6,869	2,092	..	172,363
Exchange premium on bullion bars produced..... \$	101,115	8,599,001	29,500,390	725,047	..	1,739,752	369,453	..	41,004,758
Value of ores, concentrates, slags and residues sold (shipped)..... \$	..	1,622,459	1,054,740	..	..	2,863,244	..	..	5,510,443
Total Gross Value of Production..... \$	218,420	20,179,341	64,870,440	1,568,175	..	6,627,114	799,926	..	94,263,416
Value of fuel, electricity and process supplies used, also freight on shipments, marketing, smelter and refining charges..... \$	62,170	5,158,988	12,057,387	243,773	6,457	1,327,216	173,041	..	19,029,032
Net Value of Production..... \$	156,250	15,020,353	52,813,053	1,324,402	-6,457	5,299,898	626,885	..	75,234,384

(*) In addition, there were 481,622 ounces of silver contained in concentrates, etc., shipped to smelters. (See following table for other details).

MINERAL PRODUCTION OF CANADA

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Table 57.—Ores, Concentrates, Slags, Etc., Shipped to Smelters from Canadian Gold Mines, 1930-1944

Year	To Canadian plants						To Foreign plants					
	Ores			Concentrates			Ores			Concentrates		
	Tons	Gold content fine oz.		Tons	Gold content fine oz.		Tons	Gold content fine oz.		Tons	Gold content fine oz.	Slags, residues, precipitates
1930.....	52,540	22,910		1,187	9,665	2	70,407	22,432		18,276	46,102	53
1931.....	51,579	21,756		3,120	16,805	12	24,244	11,870		20,271	48,743	47
1932.....	36,397	17,943		191	952	26	36,736	15,810		16,925	52,508	30
1933.....	30,096	14,882		490	1,349	55	3,292	2,203		29,111	76,601	34
1934.....	48,106	29,688		2,490	10,440	203	1,419	1,936		43,083	114,476	27
1935.....	18,239	7,008		7,045	35,958	58	1,242	2,840		46,050	90,167	25
1936.....	4,705	6,567		7,865	34,654	64	1,864	3,421		65,600	137,273	25
1937.....	37,126	9,649		6,981	21,865	130	2,516	8,108		62,987	163,781	74
1938.....	172,377	36,008		8,404	25,552	37	4,445	8,443		40,828	142,513	1,281
1939.....	271,666	47,114		7,747	24,184	797	3,853	8,930		39,530	112,126	235
1940.....	201,941	34,315		4,485	13,532	158	7,453	8,107		44,570	125,704	103
1941.....	202,943	38,380		1,628	7,492	369	7,453	11,222		43,855	122,619	115
1942.....	280,978	38,492		2,555	7,307	137	1,356	1,020		40,428	126,931	68
1943.....	268,334	36,429		4,490	12,335	311	.....	.....		20,615	59,949	40
1944.....	205,379	26,535		4,835	11,900	143	.....	.....		20,755	54,233	73
Grand Total	1,832,406	337,676		61,513	233,990	2,502	166,370	106,342		552,914	1,473,726	2,230
												314,033

NOTE.—In addition, other material contained in ore shipped by gold mines in 1944 included: Silver, 470,896 fine ounces; copper, 264,034 pounds; lead, 3,894,312 pounds; tungsten concentrates, 32 tons, and 808 tons refined As₂O₃. Arsenic in auriferous ores exported from British Columbia is not paid for and data relating to its possible recovery are unavailable.

NOTE.—In addition, other material contained in ores shipped by gold mines to Canadian plants in 1944 included: Silver, 10,926 fine ounces; copper, 892,566 pounds; lead, 10,123 pounds, and crude As₂O₃, 882,000 pounds.

Table 58.—Ores, Concentrates and Slag Shipped from the Auriferous Quartz Mines in Canada, 1944

	Ontario mines shipping		Quebec mines shipping		British Columbia mines shipping	
	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters	To Canadian smelters	To Foreign smelters
Number of mines.....	8	6	8	1	8	7
Tons of ore, etc., shipped.....	335	4,131	208,595	808	1,427	16,729
Metal content—						
Gold.....oz.	2,004	19,302	37,001		1,288	70,886
Silver.....oz.	3,926	341,602	5,389		1,611	129,094
Copper.....lb.	5,261		887,804			264,034
Lead (a).....lb.		705,067			10,123	3,189,245
Antimony (b).....lb.						(c)
Arsenic.....lb.			358	808		
Zinc.....lb.		1,021,685			5,712	
Tungsten concentrates*.....lb.		7,515				
Cadmium.....lb.						
Value—Gross.....\$	74,234	980,506	1,517,408	105,051	46,803	2,816,441

(a) Some B.C. gold ores exported contain relatively large quantities of lead which are not reported by the producer; this lead is reported by the U.S. Smelters and 50 per cent is credited to Canadian lead production.

(b) Any antimony recovered from Canadian ores in Canadian smelters is not usually reported by mine operators.

(*) WO content; value included also in miscellaneous metal mining industries.

(c) Arsenic not paid for and quantity not reported.

Table 59.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Canada, 1944

Name of Mine	Development and exploration (a)	Mining	Milling	General (b)	Total before taxes (c)	Total including taxes
	\$	\$	\$	\$	\$	\$
QUEBEC						
Beattie Gold Mines (Quebec) Limited.....	0.61	2.71	2.69	1.02	7.03	(f)
Belleterre Quebec Mines Limited.....	1.080	4.355	1.369	0.405	7.209	8.677
Canadian Malartic Gold Mines Limited.....	0.61	1.30	0.70	0.47	3.08	3.10
Francoeur Gold Mines Limited.....	1.03	2.10	1.57	0.91	5.61	5.65
Lamaque Mining Company Limited.....	0.80	2.43	0.94	1.03	5.20	6.60
McWatters Gold Mines Limited.....	0.69	2.51	1.76	1.61	6.57	(f)
O'Brien Gold Mines Limited.....	1.61	5.01	1.98	2.80	11.40	5.22
Senator-Rouyn Limited.....	0.86	2.22	1.01	1.13	5.22	5.22
Sigma Mines (Quebec) Limited.....	0.617	2.320	0.705	0.384	4.026	4.858
Siscoe Gold Mines Limited.....	0.30	1.73	0.74	0.43	3.20	(f) (g)
Sladen-Malartic Mines Limited.....	0.46	1.68	0.83	0.37	3.34	3.37
Stadacona Rouyn Mines Limited.....	0.96	2.24	0.86	0.47	4.53	(f)
West Malartic Mines Limited.....	0.559	2.110	1.018	0.536	4.223	(f)
ONTARIO						
Porcupine District						
Aunor Gold Mines Limited.....	0.59	4.17	1.21	1.00	6.97	10.44
Bonetal Gold Mines Limited.....	0.48	3.32	1.46	0.81	6.07	(f)
Broulan Porcupine Mines Limited.....	0.40	2.65	0.94	1.18	5.17	(f)
Buffalo Ankerite Gold Mines Limited.....	1.158	3.355	0.822	0.867	6.202	6.646 (e)
Coniaurum Mines Limited.....	1.66	3.20	1.20	1.55	7.61	8.45
Dome Mines Limited.....	0.560	1.889	1.048	0.744	4.241	6.335 (d)
Hollinger Cons. Gold Mines Ltd. (Timmins).....	1.0575	3.3284	0.7272	0.9765	6.0896	6.9319
Hollinger Cons. Gold Mines Ltd. (Ross).....	0.3495	1.5260	2.0427	0.5984	4.5166	4.9808
McIntyre Porcupine Mines Limited.....	0.654	4.398	1.050	0.304	6.406	8.096
Pamcur Porcupine Mines Limited.....	0.11	1.20	0.63	0.22	2.16	2.41
Paymaster Cons. Mines Limited.....	0.90	3.28	1.51	0.61	6.30	6.78
Preston East Dome Mines Limited.....	1.31	3.52	0.81	0.30	5.94	7.98 (g)
Kirkland Lake District						
Bidgood Kirkland Gold Mines Limited.....	2.73	3.28	1.60	0.94	8.55	8.55
Macassa Mines Limited.....	1.41	4.00	1.54	1.76	8.71	10.70
The Teck-Hughes Gold Mines Limited.....	(h)	3.80	1.26	1.37	6.43	7.42
Upper Canada Mines Limited.....	1.15	5.30	1.18	1.06	8.69	9.84
Wright-Hargreaves Mines Limited.....	(h)	5.053	1.600	1.714	8.367	11.713

Table 59.—Specified Costs per Ton of Ore Milled at Certain of the Principal Auriferous Quartz Mines in Ontario, 1944—Concluded

Name of Mine	Develop- ment and explora- tion (a)	Mining	Milling	General (b)	Total before taxes (c)	Total including taxes
Larder Lake District	\$	\$	\$	\$	\$	\$
Chesterville Larder Lake Gold Mining Co. Limited...	0.85	1.64	1.09	0.63	4.21	4.21
Kerr-Addison Gold Mines Limited.....	0.622	1.014	0.675	0.471	2.782	3.528
Omega Gold Mines Limited.....	0.152	2.896	1.492	0.100	4.640	(f)
Matachewan District						
Hollinger Cons. Gold Mines Ltd. (Young Davidson) ..	0.0383	1.3133	0.8561	0.4723	2.6800	2.8477
Matachewan Cons. Mines Limited.....	0.271	1.018	0.824	0.543	2.656	(f)
Thunder Bay District						
Leitch Gold Mines Limited.....	0.97	10.41	3.49	0.38	15.25	20.32
Little Long Lac Gold Mines Limited.....	2.54	4.14	2.35	1.87	10.90	11.59
MacLeod-Cockshutt Gold Mines Limited.....	1.6899	3.4087	2.3266	1.7545	9.1797	12.4903
Patricia District						
Central Patricia Gold Mines Limited.....	0.72	3.22	1.32	1.57	6.83	9.22
Cochennour Willans Gold Mines Limited.....	2.493	3.332	2.002	2.711	10.538	14.659
Hasaga Gold Mines Limited.....	0.747	1.506	1.188	0.47	3.91	3.922
Madsen Red Lake Gold Mines Limited.....	0.370	2.007	1.058	1.013	4.448	5.578
McKenzie Red Lake Gold Mines Limited.....	0.947	3.39	1.41	1.303	7.05	(f)
McMarnac Red Lake Gold Mines Limited.....	0.63	1.79	0.77	1.10	4.29	(f)
Pickle Crow Gold Mines Limited.....	2.22	4.65	1.48	1.58	9.93	(f)
BRITISH COLUMBIA						
Bralorne Mines Limited.....	1.03	3.56	0.97	3.04	8.60	10.61
Cariboo Gold Quartz Mining Co. Limited.....	1.435	10.632	3.464	1.069	16.600	19.868
Hedley Mascot Gold Mines Limited.....	2.13	2.02	2.44	3.45	10.04	10.22
Island Mountain Mines Co. Limited.....	0.79	7.18	4.11	0.42	12.50	14.10
Kelowna Exploration Co. Limited.....	1.3265	2.9068	2.1026	3.4127	9.7486	11.8316
Pioneer Gold Mines of B.C. Limited.....	5.58	6.34	3.58	4.70	20.20	20.20
Sheep Creek Gold Mines Limited (i).....	0.133	3.733	1.908	1.398	.....	7.172

(a) Exclusive of outside exploration.

(b) Marketing, head office, etc. (exclusive of taxes).

(c) Depreciation not included.

(d) Includes depreciation and outside exploration.

(e) Includes depreciation.

(f) Not recorded, or no taxes reported.

(g) Includes write-offs.

(h) Included with mining.

(i) Data for 1943; milling ceased June 17, 1944.

Table 60.—Dividends Paid and Ore Reserves of Specified Canadian Gold Mining Companies 1944

Name of Firm	Dividends Paid		Estimated Ore Reserve (*)	
	During 1944	Total to Dec. 31, 1944	Total	Average ounces or dwts. fine gold or \$ per ton
QUEBEC	\$	\$	tons	
Beattie Gold Mines (Quebec) Limited.....		4,435,036 (a)	3,778,400	0.130 oz.
Belleterre Quebec Mines Limited.....			631,650 (o)	0.351 oz.
Canadian Malartic Gold Mines Limited.....	146,054	2,007,020 (b)	1,690,000	0.123
East Malartic Mines Limited.....		2,200,000 (n)	2,805,399	\$7.49
Francoeur Gold Mines Limited.....		208,884 (d)	329,000	0.25 oz.
Lamaque Mining Company Limited.....	555,650	8,757,521 (c)	2,530,212	4.29 dwts.
Malartic Gold Fields Limited.....		400,000 (e)	534,040	0.19 oz.
McWatters Gold Mines Limited.....		653,577 (i)	895,845	0.24 oz.
Mic-Mac Mines Limited.....			(g)	(g)
O'Brien Gold Mines Limited.....	130,000	1,462,500 (p)	200,151	0.424
Perron Gold Mines Limited.....	160,000	2,100,000 (l)	263,100	0.199
Powell Rouyn Gold Mines Limited.....	25,000	287,500 (i)	480,024	0.135
Senator-Rouyn Limited.....		102,250 (j)	100,000	0.109
Sigma Mines (Quebec) Limited.....	900,000	2,850,000 (k)	213,588	0.186
Siscoe Gold Mines Limited.....	139,202	8,163,203 (l)	1,403,000	4.16 dwts.
Stadacona Malartic Mines Limited.....			589,372	\$4.24
Stadacona Rouyn Mines Limited.....			664,000	\$4.10
Sullivan Consolidated Mines Limited.....	200,000	2,240,000 (m)	(g)	(g)
West Malartic Mines Limited.....			632,100	5.37 dwts.
			(g)	(g)

(a) Exclusive Dorchester mine; January 1, 1945.

(b) Probable; December 31, 1944.

(c) Positive; December 31, 1944; includes broken ore.

(d) January 1, 1943.

(e) Fully developed January 1, 1944.

(f) Operations ceased August 31, 1944.

(g) Data not available at present.

(h) October 1, 1944; broken and probable ore.

(i) March 31, 1945.

(j) January 1, 1944, to 1300 feet.

(k) January 1, 1945; includes 475,500 tons broken ore.

(l) January 1, 1944.

(m) March, 1944.

(n) January 1, 1944; solid and broken ore above 10th level, before dilution; \$35.00 gold.

(o) Broken and in place March 31, 1945.

(p) October 1944 broken and probable.

(*) Subject to revision.

ONTARIO				
Porcupine District				
Aunor Gold Mines Ltd.....	400,000	1,400,000 (c)	568,750	0.351 oz.
Bonetal Gold Mines Ltd.....			(d)	(d)
Broulan Porcupine Mines Ltd.....	228,900	1,037,192	345,000	0.18 oz.
Buffalo Ankerite Gold Mines Ltd.....	105,252	2,727,925 (f)	293,170	\$7.464
Coniaurum Mines Ltd.....	221,339	3,006,412 (g)	77,451	5.86 dwts.
Delnite Mines Ltd.....		625,541	(d)	(d)
Dome Mines Ltd.....	2,920,002	58,541,873 (e)	2,353,000	(d)
Hallnor Mines Ltd.....	400,000	5,500,000 (e)	550,372	0.35 oz.
Hollinger Cons. Gold Mines Ltd. (Timmins).....	2,263,200	118,549,600 (e)	7,507,976	0.33 oz.
Hollinger Cons. Gold Mines Ltd. (Ross).....			648,010	0.230 oz.
Hoyle Gold Mines Ltd.....			(d)	(d)
McIntyre Porcupine Mines Ltd.....	2,657,340	35,726,493 (i)	4,444,117	0.3132 oz.
Pamour Porcupine Mines Ltd.....	250,000	3,300,000 (j)	1,317,000	0.110 oz.
Paymaster Cons. Mines Ltd.....	85,290	604,034 (k)	562,666	0.227 oz.
Preston East Dome Mines Ltd.....	600,000	3,300,000 (j)	675,490	0.225 oz.
Kirkland Lake District				
Bidgood Kirkland Gold Mines Ltd.....			(d)	(d)
Kirkland Lake Gold Mining Co. Ltd.....	213,068	4,146,943 (l)	352,968	\$14.85
Lake Shore Mines Ltd.....	1,600,000	92,420,000	(d)	(d)
Macassa Mines Ltd.....	482,052	6,808,183 (j)	462,800	0.452 oz.
Sylvanite Gold Mines Ltd.....	395,940	9,060,427 (m)	57,021	(h) (b)
Teck-Hughes Gold Mines Ltd.....	1,201,786	39,729,152 (j)	285,478	6.92 dwts.
Toburn Gold Mines Ltd.....	74,000	2,275,500 (j)	77,600	0.51 oz.
Upper Canada Mines Ltd.....	222,229	1,422,249	(d)	(d)
Wright-Hargreaves Mines Ltd.....	1,375,000	42,402,500 (n)	1,060,835	\$18.76

Table 60.—Dividends Paid and Ore Reserves of Specified Canadian Gold Mining Companies 1944—Continued

Name of Firm	Dividends Paid		Estimated Ore Reserve (*)	
	During 1944	Total to Dec. 31, 1944	Total	Average ounces or dwts. fine gold or \$ per ton
Larder Lake District	\$	\$	tons	
The Chesterville Larder Lake Gold Mining Co. Ltd.....		442,568	(o) 470,000	\$5.26
Kerr-Addison Gold Mines Ltd.....	1,419,090	7,095,451	(p) 8,300,918	0.2004 oz.
Omega Gold Mines Ltd.....			(q) 308,000	0.147 oz.
Matachewan District				
Hollinger Cons. Gold Mines Ltd. (Young-Davidson).....	23,762	277,219	(m) 1,125,456	(d)
Matachewan Consolidated Mines Ltd.....		68,600	(r) 1,150,200	0.108 oz.
Sudbury District				
Jerome Gold Mines Ltd.....			(s) 295,373	0.199 oz.
Thunder Bay District				
Hard Rock Gold Mines Ltd.....		926,923	(t) 142,000	\$10.42
Leitch Gold Mines Ltd.....	229,100	1,454,603	(u) 186,226	\$30.01
Little Long Lac Gold Mines Ltd.....	110,460	3,811,275	(e) 499,449	0.349 oz.
MacLeod-Cockshutt Gold Mines Ltd.....	143,124	1,424,145	(v) 586,652	0.227 oz.
Patricia District				
Berens River Mines Ltd.....		420,000	(c) 112,500	Gold 0.25 oz. Silver 10 oz.
Cochénour Willans Gold Mines Ltd.....	177,699	975,846	(d)	(d)
Central Patricia Gold Mines Ltd.....	300,000	3,675,000	(j) 441,912	0.36 oz.
Hasaga Gold Mines Ltd.....			(r) 282,726	\$5.16
Madsen Red Lake Gold Mines Ltd.....	279,962	1,013,663	(h) 628,545	0.199 oz.
McMarnac Red Lake Gold Mines Ltd.....	(b)	82,000	(d)	(d)
McKenzie Red Lake Gold Mines Ltd.....	205,450	2,801,850	(d)	(d)
Pickle Crow Gold Mines Ltd.....	300,000	7,950,000	(w) 651,865	\$13.10

(a) To end of 1943.

(b) Not recorded.

(c) January 1, 1945.

(d) Not available at present.

(e) January 1, 1945; exclusive of dilution.

(f) January 1, 1945; positive and broken gold at \$38.50 per ounce.

(g) January 1, 1944; broken ore.

(h) February 28, 1945 in place and broken.

(i) March 31, 1945; in place and broken.

(j) January 1, 1945; in place and broken.

(k) June 30, 1944; broken and in place.

(l) January 1, 1945; broken and in place; gold at \$35 per ounce.

(m) January, 1945; broken ore.

(n) August 31, 1944; gold at \$38.50 per ounce.

(o) January 1, 1944; broken and in place.

(p) January 1, 1945; in place and broken above 1,450 foot level after allowing for dilution.

(q) March 31, 1945.

(r) January 1, 1945; partial.

(s) January, 1945; after making allowance for dilution.

(t) January, 1945, after sorting.

(u) January 1, 1945; gold at \$35.

(v) September 30, 1944.

(w) December 31, 1944; gold at \$35 per ounce.

MANITOBA				
San Antonio Gold Mines Ltd.....	478,513	4,274,417	(b) 860,000	(a)

(a) Not available.

(b) January 1, 1945.

Table 60—Dividends Paid and Ore Reserves of Specified Canadian Gold Mining Companies 1944—Concluded

Name of Firm	Dividends Paid		Estimated Ore Reserve (*)	
	During 1943	Total to Dec. 31, 1943	Total	Average ounces or dwts. fine gold or \$ per ton
BRITISH COLUMBIA				
	\$	\$	tons	
Bralorne Mines Limited.....	1,496,400	12,958,550	(c) 1,100,000	0.514 oz.
Cariboo Gold Quartz Mining Co. Limited.....		1,679,968	(d) 378,068	0.39 oz.
Hedley Mascot Gold Mines Limited.....		1,290,556	(e) 164,792	0.364 oz.
Island Mojtaint Mines Co. Limited.....	52,536	1,034,944	(g) 68,000	0.46 oz.
Kelowna Exploration Co. Limited.....	150,000	1,350,000	(f)	(f)
Pioneer Gold Mines of B.C. Limited.....		9,299,392	(a) 201,487	0.428 oz.
Privateer Mine Limited (inc. Prident).....	49,082	1,914,183	(h) 23,870	\$15.30
Sheep Creek Gold Mines Limited.....	225,000	2,362,500	(i) 100,397	0.367 oz.
				0.26 oz.
Silbak Premier Mines Limited.....	125,000	2,250,000	(b) 92,802	0.26 oz. gold 2.59 oz. silver

(a) March 31, 1944; in place and broken.

(b) December 31, 1944; assured and probable ore, broken and unbroken.

(c) December 31, 1944; exclusive of 195,000 tons low-grade averaging 0.20 oz.

(d) July 31, 1944.

(e) December 31, 1943.

(f) Data not available at present.

(g) December 31, 1943.

(h) December 31, 1943; gold at \$35 per oz.; operations suspended November, 1943.

(i) May 31, 1944.

NORTHWEST TERRITORIES				
Negus Mines Ltd.....	99,850	449,325	(a) 23,800	0.74 oz.

(a) December 31, 1944; milling suspended October 18, 1944.

(*) Subject to revision and based on information secured from companies' annual printed reports.

It should be noted that annual estimates of ore reserves are more or less based on current development and exploration to date, and that eventual or actual ore reserves of most producing mines are often in excess of those recorded in this report.

Table 61.—Certain Data Relating to the Production of Gold by the Entire Auriferous Quartz Mining Industry in Canada, 1928-1944 (Averages)

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter refinery treatment of ores and bullion shipped per ounce of gold produced	Taxes per ounce of gold produced	Total of specified costs
	ounces	\$	\$	\$	\$	\$	\$
1928.....	206	1.47	7.45	Information not available	Information not available	Information not available	.....
1929.....	218	1.46	7.18	2028 to 1934	1923 to 1936	1923 to 1943	.....
1930.....	237	1.25	6.63				.....
1931 (a).....	250	1.19	6.50				.....
1932.....	255	1.21	6.31				.....
1933 (b).....	207	1.36	7.45				.....
1934 (c).....	154	1.71	9.64				.....
1935.....	146	1.89	10.48	4.38			16.75
1936.....	137	1.98	11.32	4.46			17.76
1937.....	132	2.10	12.18	4.65 (d)	0.33		19.26
1938.....	150	1.85	10.95	4.53	0.56		17.89
1939.....	157	1.81	10.69	4.45	0.67		17.62
1940.....	161	1.76	10.48	4.49	0.69		17.42
1941.....	155	1.82	11.56	4.53	0.77		18.68
1942.....	176	1.84	11.47	4.34	0.75		18.40
1943.....	176.7	2.12	11.47	4.24	0.69	4.89	23.41
1944.....	159	2.43	12.81	4.60	0.81	4.15	24.80

(a) Equalization exchange premiums paid by the Dominion Government to gold miners (Great Britain goes off gold standard).

(b) United States goes off gold standard.

(c) United States gold dollar reduced in weight from 25.8 to 15 5/21 grains, 0.9 fine.

(d) Not including Mint charges and marketing prior to 1938.

NOTE.—The data contained in the foregoing table have been compiled from reports received from both producing and non-producing (exploring and developing) operators in the auriferous quartz mining industry. This fact should be noted if the information is to be construed or employed as possible criteria for technological or other statistical study. The trends revealed are not to be interpreted as entirely reflecting "Cause and effect" in the operation of producing mines only but rather as indices of change in the industry as a whole. For data relating to producers only, see Table 62.

Table 62.—Certain Data (Averages) Relating to the Total Production of Gold by Producers Only in the Auriferous Quartz Mining Industry in Canada, 1931, 1939-1944

Year	Ounces of gold produced per wage-earner year	Cost of fuel and electricity per ounce of gold produced	Cost of wages per ounce of gold produced	Cost of explosives and other process supplies used per ounce of gold produced	Cost of freight and smelter refinery treatment of ores and bullion shipped per ounce of gold produced	Taxes per ounce of gold produced	Total of specified costs
	ounces	\$	\$	\$	\$	\$	\$
1931.....	256	1.19	6.38	(*)	(*)	(*)	.....
1939.....	164	1.76	10.25	4.33	0.67	(*)	17.01
1940.....	165	1.72	10.20	4.41	0.69	(*)	17.02
1941.....	158	1.79	11.37	4.46	0.77	(*)	18.39
1942.....	177	1.83	11.41	4.33	0.75	(*)	18.32
1943.....	177	2.12	11.42	4.23	0.69	4.89	23.35
1944.....	163	2.41	12.59	4.57	0.81	4.12	24.50

(*) Data not available.

Table 63.—Principal Statistics Relative to All Ontario Gold Mines by Areas (d), 1942-1944

Camp or district	Number of producers	Ore (e) treated	Total gold recovered	Average ounces per ton recovered	Employees	Salaries and wages paid	Cost of fuel, electricity and process supplies
1942	No.	Tons	Fine oz.		No.	\$	\$
Porcupine.....	20	5,624,554	1,308,291	0.23	8,499	18,209,637	7,501,441
Kirkland Lake.....	10	(b) 1,309,361	543,284	0.41	2,946	6,028,485	2,812,489
Larder Lake.....	4	1,166,209	214,751	0.18	1,057	2,119,060	1,033,205
Matachewan.....	2	611,982	59,085	0.10	392	810,796	621,333
Sudbury.....	2	200,011	33,414	0.17	339	687,691	269,285
Algoma.....	3	52,125	8,804	0.16	98	197,350	94,898
Thunder Bay.....	10	662,816	218,430	0.24	1,366	3,061,671	1,790,286
Rainy River and Kenora.....	5	36,449	12,039	0.25	125	243,690	93,348
Patricia.....	11	987,697	294,103	0.23	1,754	3,721,469	1,760,838
Total.....	67	10,651,204	2,692,201	0.24	16,576	35,079,849	15,977,123
1943							
Porcupine.....	17	4,297,973	1,020,973	0.24	6,519	14,115,867	5,581,209
Kirkland Lake.....	9	(b) 1,114,818	466,052	0.42	2,514	5,429,511	2,435,094
Larder Lake.....	4	981,020	169,281	0.17	730	1,561,707	995,761
Matachewan.....	2	442,506	38,722	0.09	279	569,835	465,629
Sudbury.....	1	107,608	18,641	0.17	119	239,018	126,721
Algoma.....	1	1,782	254	0.14	10	14,965	5,566
Thunder Bay.....	5	(a) 438,522	141,504	0.32	919	2,011,819	1,145,151
Rainy River and Kenora.....	3	3,420	1,546	0.45	13	26,111	10,255
Patricia.....	9	681,714	203,964	0.30	1,227	2,707,544	1,348,422
Total.....	51	8,069,363	2,060,937	0.25	12,330	26,726,377	12,113,805
1944							
Porcupine.....	16	3,788,313	873,027	0.23	6,022	13,225,351	5,085,404
Kirkland Lake.....	9	1,011,225	383,167	0.38	2,346	5,129,054	2,396,345
Larder Lake.....	3	752,954	114,838	0.15	644	1,371,210	875,748
Matachewan.....	2	341,359	28,635	0.08	238	507,215	421,418
Sudbury.....	1	.....	(c) 49	.....	64	157,374	74,995
Thunder Bay.....	4	(a) 305,276	100,667	0.33	695	1,576,544	943,352
Rainy River and Kenora.....	.....	.....	.....	.....	3	4,233	.....
Patricia.....	8	601,441	175,657	0.29	1,107	2,481,223	1,384,795
Total.....	43	6,800,568	1,676,040	0.24	11,119	24,452,204	11,182,057

(a) In addition, 5,887 tons tailings were retreated in 1943 and 15,732 tons in 1944.

(b) In addition, 5,176 tons tailings were retreated in 1942, and 6,863 tons in 1943.

(c) Mill clean-up.

(d) Includes data for all active properties.

(e) Does not include low-grade discarded by sorting, but includes crude ore milled or smelted.

Table 64.—Milling Capacity of Operating Canadian Gold Mines, 1935-1944
(Tons of 2,000 pounds per 24 hours)

Year	Nova Scotia	Quebec	Ontario	Manitoba	Saskatchewan	British Columbia	Northwest Territories
1935.....	292	3,368	20,921	1,465	.....	2,990	.....
1936.....	713	4,514	22,639	1,000	.....	4,120	.....
1937.....	565	6,090	25,249	975	30	3,915	.....
1938.....	542	8,217	30,097	875	1,000	4,590	.....
1939.....	562	9,580	33,324	865	1,000	4,417	.....
1940.....	450	11,215	35,030	690	1,200	4,255	275
1941.....	319	12,654	37,416	990	1,355	4,510	510
1942.....	247	14,330	36,135	903	1,202	4,303	710
1943.....	280	13,304	32,555	753	2	2,845	510
1944.....	180	13,059	30,710	550	.....	2,650	66

Table 65.—Ores Mined and Treated by Auriferous Quartz Mining Industry for Years Specified

Year	Ore hoisted	Ore milled (c)	Crude ore shipped to smelters (d)	Low grade sorted out	Tailings retreated	Gold recovered as bullion (b)	Gold in crude ore shipped	Gold in concentrates, slag, etc., shipped
	tons	tons	tons	tons	tons	fine oz.	fine oz.	fine oz.
1925.....	3,646,460	3,527,021	(g) 118,436	(a)	48,475	1,482,294	97,011	34,131
1930.....	4,472,803	4,306,869	123,037	(a)	37,095	1,782,556	45,342	56,893
1935.....	8,832,901	8,888,129	19,481	(a)	57,798	2,492,145	9,848	143,666
1936.....	10,694,208	10,504,181	6,569	(a)	33,814	2,903,063	9,988	192,439
1937.....	12,388,489	11,880,323	39,642	457,622	97,710	3,283,795	17,757	188,618
1938.....	14,749,649	14,158,555	176,822	528,696	64,926	3,810,642	44,451	191,586
1939.....	17,105,744	16,150,173	275,519	660,578	18,426	4,160,352	56,044	167,448
1940.....	18,986,306	18,083,439	209,394	757,538	180,311	4,886,673	42,422	190,157
1941.....	20,031,736	19,026,273	210,396	936,003	480,289	4,405,986	49,602 (e)	190,738
1942.....	17,722,866	16,820,442	282,334	658,439	5,176	3,898,999	39,512 (e)	193,068
1943.....	12,853,610	12,206,518	268,334	361,522	29,716	2,869,635	36,429	109,055
1944.....	10,790,495	10,330,899	205,379	234,820 (f)	18,233	2,300,090	26,535	103,946

(a) Not available.

(b) Content of bullion shipped 1925-1935; 1936-1943 content of bullion produced.

(c) + (d) = total crude ore treated (not including sorted material).

(e) Gold in material shipped by gold mines to other gold mines for treatment is included under bullion.

(f) Gold recovered from tailings 4,898 fine ounces; included with bullion.

(g) In addition, a relatively small tonnage of unclassified ores was shipped.

Table 66.—Gold Content of Bullion Produced and of Ores, Concentrates, etc., Shipped, with Average Grade of Ore Shipped and Ore Milled at Auriferous Quartz Mines in Canada, with Average Price of Gold in Canadian Funds, 1929-1944

Year	Tonnage treated (c)	Gold content fine oz. (b)	Oz. of fine gold per ton	Average price of gold
1929.....	4,371,143	1,771,526	0.41	20.67
1930.....	4,429,906	1,884,791	0.43	20.67
1931.....	5,526,379	2,271,278	0.41	21.55
1932.....	5,997,492	2,502,327	0.42	23.47
1933.....	6,480,164	2,455,365	0.38	28.60
1934.....	7,524,803	2,490,513	0.33	34.50
1935.....	8,907,610	2,645,659	0.30	35.19
1936.....	10,510,750	3,095,427	0.29	35.03
1937.....	(a) 11,919,965	3,490,170	0.29	34.99
1938.....	(a) 14,335,377	4,046,679	0.28	35.17
1939.....	(a) 16,425,692	4,383,844	0.27	36.14
1940.....	(a) 18,292,833	4,619,252	0.25	38.50
1941.....	(a) 19,236,669	4,646,326	0.24	38.50
1942.....	(a) 17,102,776	4,131,579	0.24	38.50
1943.....	(a) 12,474,852	3,015,119	0.24	38.50
1944.....	(a) 10,536,278	2,430,571	0.23	38.50

(a) Material discarded by sorting not included.

(b) Relatively small quantity of gold contained in concentrates, slags, etc., shipped and in cyanide solution in circuit may have originated in ores treated during the previous year; from 1937 represents metal content of total bullion produced plus metal in ores or concentrates shipped to smelters.

(c) Does not include tailings retreated, but includes ore milled plus crude ore shipped to smelters.

Table 67.—Specified Taxes Paid by Active Canadian Auriferous Quartz Mines in 1943 and 1944 by Provinces (*)

Nature of Tax	Nova Scotia	Quebec	Ontario	Manitoba	British Columbia	North- west Terri- tories	Canada
	\$	\$	\$	\$	\$	\$	\$
1943							
Dominion Income Tax, including tax on non-operating revenue.....		642,554	3,801,912	103,599	465,639	8,910	5,022,614
Dominion Excess Profits Tax.....		1,073,768	5,871,066	(a)187,724	622,626	41,979	7,797,163
Provincial taxes.....	374	372,287	940,066	801	156,937	13,977	1,484,442
Municipal taxes.....	616	123,423	283,473		(b) 9,127	12,929	429,563
Total all specified taxes.....	990	2,212,032	10,896,517	292,124	1,254,329	77,795	14,733,787
1944							
Dominion Income Tax, including tax on non-operating revenue.....		467,394	3,568,048	112,499	221,954	29,538	4,399,433
Dominion Excess Profits Tax.....		433,886	3,422,893	211,655	256,872	23,914	4,349,220
Provincial taxes.....	561	241,873	646,464		106,401	4,677	999,976
Municipal taxes.....	938	122,090	194,250		16,847	1,937	336,062
Total all specified taxes.....	1,499	1,265,243	7,831,655	324,154	(c)602,074	60,066	10,084,691

(*) Does not include complete data relating to taxes that may have been paid by dormant firms.

(a) Includes \$30,832 U.S.A. income taxes.

(b) Includes \$4,489 other taxes.

(c) Includes \$5,739 other taxes.

Table 68.—Certain Specified Expenditures Made by Auriferous Quartz Mining Companies, 1942, 1943 and 1944

Province and year	Workmen's compensa- tion	Silicosis assessment	Unemploy- ment insurance	Aggregate cost of all supplies purchased	Aggregate cost of plant and equipment purchased	Cost of buildings, machinery and equipment erected or installed
	\$	\$	\$	\$	\$	\$
Nova Scotia—						
1942.....	4,413		958	13,624	5,400	(*)
1943.....	5,032		1,000	28,508	6,000	(*)
1944.....	4,511		935	30,108	5,290	(*)
Quebec—						
1942.....	356,993	3,733	70,804	6,156,189	1,294,253	(*)
1943.....	276,270	3,864	65,393	4,985,946	392,997	(*)
1944.....	268,668	604	54,237	4,486,519	484,699	514,139
Ontario—						
1942.....	852,379	746,827	227,966	16,490,839	1,907,407	(*)
1943.....	679,519	562,053	194,002	12,687,037	532,737	(*)
1944.....	629,785	295,269	154,672	11,639,621	571,010	378,286
Manitoba—						
1942.....	29,554	7,003	4,988	459,890	34,674	(*)
1943.....	20,561	4,920	3,264	263,082	18,646	(*)
1944.....	12,492	3,123	2,074	225,705	12,844	20,931
Saskatchewan—						
1942.....	(*)	(*)	(*)	(*)	(*)	(*)
1943.....	(*)	(*)	(*)	(*)	(*)	(*)
1944.....	379		197	8,820	20,000	25,660
British Columbia—						
1942.....	138,086	139,043	22,748	1,863,036	83,257	(*)
1943.....	104,921	104,816	18,092	1,112,819	28,307	(*)
1944.....	114,866	71,630	13,852	1,230,811	30,289	32,415
Northwest Territories—						
1942.....	17,485		3,788	1,034,559	118,045	(*)
1943.....	17,206		2,575	451,798	573,969	(*)
1944.....	6,191		850	178,193	18,532	8,852
Total Canada—1942.....	1,398,910	896,606	331,252	26,018,137	3,443,066	(*)
1943.....	1,103,509	675,653	284,326	19,529,190	1,552,656	(*)
1944.....	1,036,892	370,626	226,817	17,799,777	1,142,664	980,283

(*) Data not available.

Table 69.—Cost of Prospecting Conducted by Canadian Auriferous Quartz Mining Companies, 1943 and 1944

(a) Province prospecting was conducted in—	By Quebec companies (b)	By Ontario companies (b)	By Manitoba companies (b)	By British Columbia companies (b)	By Northwest Territories companies (*)	Total
1943	\$	\$	\$	\$	\$	\$
Nova Scotia.....	1,987					1,987
New Brunswick.....	877					877
Quebec.....	67,905	15,601				83,506
Ontario.....	22,898	188,001	5,901	12,401		229,201
Manitoba.....	1,829	26,402	106,605	10,515		145,351
Saskatchewan.....	4,633					4,633
British Columbia.....	17	57,489		180,488		237,994
Northwest Territories.....	70				5,130	5,200
Yukon.....		4,032		11,007		15,039
Total Canada.....	100,216	291,525	112,506	214,411	5,130	723,785
1944						
Nova Scotia.....						
New Brunswick.....						
Quebec.....	503,901	80,056				583,957
Ontario.....	81,406	437,265	4,932	6,733		530,336
Manitoba.....	5,869	3,310		12,176		21,355
Saskatchewan.....						
British Columbia.....		12,815		117,701		130,516
Northwest Territories.....	95			1,563	46,837	48,495
Yukon.....				4,961		4,961
Total Canada.....	591,271	533,446	4,932	143,134	46,837	1,319,620

(a) Prospecting includes the search for new mineral deposits on the surface, and preliminary exploration.

(b) Province in which the companies' principal operations are conducted.

Table 70.—Drilling Completed on Auriferous Quartz Deposits in 1943 and 1944

	Footage Drilled (a)	
	1943	1944
Diamond drilling for exploration (testing)—		
By companies with their own equipment and personnel.....	543,062	513,333
By contractors.....	1,321,727	1,648,418
Other drilling—		
Diamond drilling for breaking rock or ore:		
By companies with their own equipment and personnel.....	97,298	83,672
By contractors.....	591,598	444,859
Drilling by percussion and other machines (b).....	20,014,708	17,830,270

(a) Subject to revision as drilling was not reported by some new companies.

(b) This is not complete as some companies do not compile these data.

The value of diamonds in all forms (bits, etc.) purchased by gold mining companies in 1944 totalled \$128,115.

THE COPPER-GOLD-SILVER MINING INDUSTRY, 1944

The mining of "copper-gold-silver" ores in Canada during 1944 was confined to the provinces of Quebec, Ontario, Manitoba, Saskatchewan and British Columbia. It is to be noted that in addition to the copper recovered from ores of this type there is a very large quantity of the metal obtained in the smelting and refining of the copper-nickel ores mined in the Sudbury area of Ontario; important quantities of gold and silver are also being extracted from these copper-nickel ores. General statistics relating to labour, etc., in the nickel-copper industry are not included in this report.

Mining operations conducted on Canadian copper-gold-silver deposits (sulphides) during 1944 were reported by 23 firms compared with 20 in 1943 and 26 in 1942. The gross value of crude ore, concentrates, etc., shipped in 1944 from the mines and mills to smelters was estimated at \$62,389,815; the cost of fuel, purchased electricity, process supplies, freight and treatment totalled \$24,191,776 and the net value of shipments was computed at \$38,198,039. Employees in 1944 totalled 5,175 compared with 5,748 in 1943 and 5,646 in 1942.

The gross value of ores shipped by firms which both mine and smelt their own ores is sometimes not reported. This necessitates considerable estimating in determining gross and net values for mine shipments. However, possible abnormal evaluations resulting from this are largely compensated for in determining the value added at the smelters and refineries. This added value is credited to the non-ferrous smelting and refining industry and is also included in the total net value of production of the entire Canadian mining industry. This fact should be noted in making any statistical study of the annual production values shown for shipments from copper-gold-silver mines.

The statistics as herein shown under the copper-gold-silver mining industry refer only to mines and mills and are not inclusive of data pertaining to the operation of smelters and refineries. Statistics relating to the reduction of non-ferrous ores are recorded under the non-ferrous smelting and refining industry.

Quebec.—Noranda Mines Limited: "A total of 4,078 feet of drifting, 88 feet of raising and 53,804 feet of exploratory diamond drilling was done in 1944 at the Horne mine. Due to the acute shortage of miners, the driving of exploratory drifts and raises was greatly curtailed during the first half of the year and entirely stopped during the second half. Consequently, the exploration of the deeper levels of the mine was largely confined to diamond drilling. During the early months of 1944 a body of medium grade ore was located in the No. 5 mineralized zone and explored by diamond drilling from the 5,975 foot level.

"During 1944 the Noranda smelter treated 1,048,438 tons of ore, concentrate and slag, including 339,820 tons of custom ores and concentrates, and produced 117,171,962 pounds of anodes. After deducting the copper, gold and silver which was recovered from slags received from various shippers, the estimated production of new metals was 113,086,814 pounds of fine copper, 246,990 ounces of gold and 1,373,482 ounces of silver. The estimated recovery from Horne mine ore and concentrate was 56,580,845 pounds of copper, 196,402 ounces of gold and 508,126 ounces of silver. During the year under review the concentrator treated 1,055,473 tons of ore from the Horne mine, from which 203,833 tons of copper-gold concentrate were produced and sent to the smelter. The cyanide mill treated 217,267 tons of pyrite from the flotation circuit tailing, from which 16,586 ounces of gold were recovered; 187,485 tons of pyrite were recovered from the cyanide mill tailing and sold to chemical plants."

Waite Amulet Mines Limited.—"No underground development was done in 1944 at the Waite mine. Due to the manpower shortage, the mining crew was reduced from two shifts to one in October. Ore hoisted totalled 105,027 tons and a total of 23,000 feet of diamond drilling was completed by stope diamond drills. Ore hoisted from the 'C' shaft totalled 96,818 tons; ore hoisted from the Amulet Dufault amounted to 405,929 tons. Most of the exploratory drilling on Amulet Dufault was for the purpose of outlining ore contacts; this work resulted in the finding of 100,000 tons of ore. Tonnage treated in the mill totalled 608,574, including 406,707 tons from the Amulet Dufault, 105,019 tons from the Waite and 96,848 tons from 'C' shaft. The average mill feed assays were: Copper 3.67 per cent; zinc 7.25 per cent; gold

0.033 ounces, and silver 1.73 ounces. Production in 1944 comprised 41,007,234 pounds of copper; 74,175,112 pounds zinc; 12,104 ounces gold and 685,265 ounces silver. A pyrite concentrating plant was built and put in operation in 1944. Exploratory diamond drilling at the Waite mine was laid out to cover the ground to the north, east and west of the known ore-bodies; it will require at least one more year to thoroughly explore the Waite ground. The area north, south and east of 'C' shaft was thoroughly drilled from the surface and a total of 49,848 tons of ore was found by this drilling."

Queмонт Mining Corporation Limited.—"In March, 1944, a magnetometer survey was made on part of the property and a number of magnetometer anomalies were indicated. Some 5,684 feet of diamond drilling was done to test some of these anomalies but as no values and no mineralization of importance were encountered, the drilling was stopped in September until after the freeze-up and was then started again in the winter from the ice on the lake for the purpose of testing an area underlying the lake in the southeastern part of the property, through which pass the Horne Creek fault and also a subsidiary shear north of the fault. The first hole known as No. 10 was located to cut through the Horne Creek fault and a magnetometer anomaly north of it. This hole intersected encouraging mineralization across a wide width containing values in copper and precious metals, a short distance north of the fault. . . . As soon as this intersection was obtained, three additional drills were put in operation. In August 1945 it was announced that an underground program was designed to thoroughly develop the orebodies indicated by the drilling and also to prospect from the bottom or 900 foot level (old shaft)."

Geological structure at the Queмонт is reported to be almost identical with that obtaining at the neighbouring Noranda mines.

Normetal Mining Corporation Limited.—"A total of 192,994 tons of ore averaging 3.28 per cent copper and 6.22 per cent zinc were milled in 1944, producing 25,996 tons of copper concentrates averaging 22.65 per cent copper, 0.139 ounces gold and 11.03 ounces silver, and also 16,528 tons of zinc concentrates averaging 53.32 per cent zinc. Development work consisted of 451 feet of shaft sinking, 1,217 feet of lateral work and raising, and 271 feet of stations and pockets. Operations during the year were again handicapped by a shortage of labour and shortage of power. Normetal and Noranda Mines Limited entered into an option on a fifty-fifty basis on the Alamac mines, which adjoins the Normetal mine on the east; diamond drilling under the supervision of Normetal, was started late in December and it is planned to do a minimum of 5,000 feet of drilling for the purpose of testing the possible extension of the Normetal ore zone to the east."

Aldermac Copper Corporation Limited.—Milling commenced August 1, 1944 at the company's new property located in Ascot township, near Sherbrooke, Quebec. Mining operations were conducted continuously throughout the year and shipments of both zinc and copper-lead concentrates were made to plants in the United States. In October 1944 it was reported that the property had been opened up by a vertical shaft to 240 feet and two levels driven at 156 and 277 feet, respectively; on the first level a length of 550 feet over an average width of 4.99 feet gave the following results: Zinc 6.47 per cent; lead 2.24 per cent; copper 1.68 per cent; gold 0.109 ounce and silver 1.56 ounces.

Ontario.—Kam-Kotia Porcupine Mines Limited: Mining operations were conducted in 1944 until December 12. This copper property lying west of Timmins, in which Hollinger Cons. Gold Mines Ltd. holds an 85 per cent interest, was financed as to plant and operation by the Metals Reserve. During the operation 189,064 tons of ore were mined by electric shovel and milled at the property. The resultant concentrates were trucked to Timmins, a distance of 22 miles, and thence by rail to the smelter at Noranda, Quebec. A summary of the results obtained in this operation, which at the request of the Government, was discontinued on January 1, 1945, showed 5,542,116 pounds of copper produced at a cost of 15 cents per pound. This includes the payment of the minimum royalty which was granted as a return for depletion of ore reserves. The total amount of royalties so received was \$65,000.

Diamond drilling of an exploratory nature was conducted in 1944 by Bandolac Mining Company Limited on a property located at Lower Shebandowan Lake, Thunder Bay district, and by the Royalite Gold Syndicate on a deposit situated in Mallard township, Sudbury district.

Manitoba and Saskatchewan.—Hudson Bay Mining and Smelting Co. Limited:

"The high rate of production established during 1943 was continued for the first quarter of 1944, but there was a gradual decline from that time on for the balance of the year as the result of labour shortages. Ore mined and hoisted from underground during 1944 totalled 2,059,206 tons assaying 2.59 per cent copper; 4.7 per cent zinc; 0.091 ounce gold and 1.37 ounces silver. The tonnage mined was excelled only in the years 1942 and 1943. A total of 229,955 cubic yards of waste filling, consisting principally of smelter slag, was placed in underground stopes. Ore milled totalled 2,027,926 tons from which were produced 391,739 tons copper concentrates assaying 11.71 per cent copper; 0.319 ounce gold and 4.84 ounces of silver and 149,526 tons of zinc concentrates assaying 45.94 per cent zinc; 0.055 ounce gold; 1.52 ounce silver and 0.50 per cent copper. From the treatment of 1,437,216 tons flotation tailings, there were recovered 18,103 ounces gold; 178,861 ounces silver and 95,638 pounds copper. The tonnage of zinc concentrates treated during the year was the highest on record, totalling 161,314 tons from which 102,458,756 pounds of slab zinc were produced. Metallic cadmium produced totalled 140,560 pounds. The copper smelter treated 408,554 tons of Hudson Bay concentrates and ores and 59,034 tons of custom concentrates; the company shipped for its own account 86,481,746 pounds of copper, 145,441 ounces of gold, 2,017,443 ounces of silver and 136,299 pounds of selenium. In addition to smelting the usual custom concentrates from Sheritt Gordon Mines Limited the company treated copper concentrates shipped from Emergency Metals Limited during the latter half of the year.

"Emergency Metals Limited completed the mining and milling of all the known ore tributary to the old Mandy shaft, thus terminating this operation. During the year 62,227 tons of ore were milled which produced concentrates yielding 6,000,585 pounds of copper, 10,644,284 pounds of zinc, 3,501 ounces of gold and 69,265 ounces of silver."

Sheritt Gordon Mines Limited: "The company in 1944 milled 731,783 tons of ore. Mill feed assayed copper 1.888 per cent; zinc 2.678 per cent; gold 0.0159 ounce and silver 0.470 ounce. Recoveries were as follows: copper 91.05 per cent; zinc 64.92 per cent; gold 63.33 per cent and silver 69.31 per cent. Throughout the year the mill operated approximately five days per week; the period of operation was ample to take care of the weekly mine output. No new ore was found during the year, so that ore reserves were reduced by the tonnage milled. In 1944 considerable diamond drilling was completed on the easterly extension of the Bob Lake structure but nothing of economic importance was encountered. Other diamond drilling was done to the east of the east orebody and, although considerable further drilling will have to be done to determine potentialities, there is nevertheless encouragement in that disseminated copper mineralization was found in this area. Towards the end of 1944, the British Ministry of Supply gave notice that, after the end of January, its contract to buy copper from the company would be terminated, but satisfactory arrangements have been made to sell this copper to one of the government agencies in the United States. Zinc concentrates can now be sold at a reasonable profit, and a contract is now in force which runs to the end of September 1945. Production in 1944 comprised 24,541,313 pounds copper; 7,059 ounces gold; 226,349 ounces silver and 23,910 tons of zinc concentrates. The net cost of electrolytic copper f.o.b. refinery was 8.786 cents per pound and the production cost of zinc concentrate \$13.243 per ton."

British Columbia.—Britannia Mining and Smelting Co. Limited conducted mining and milling operations throughout 1944 at Britannia Beach; copper concentrates and copper precipitate were exported to the United States and pyrite was marketed in both Canada and the United States. The company reported that "The Britannia property produced at about 50 per cent of normal capacity. The labour shortage which became acute during 1943, did not improve and continued about static during the past year. Development and exploration work were again curtailed. A contract with Wartime Metals Corporation, an agency of the Canadian Government, under which production costs were guaranteed and a small profit allowed, remained in effect throughout the year, but has now been cancelled, as of December 31, 1944.

Until an adequate labour supply is available for this mine the outlook for a satisfactory operation is not good." Ore milled totalled 606,717 tons and production comprised 34,101 tons copper concentrates; 524 tons copper precipitate and 17,053 tons of iron pyrites.

Granby Consolidated Mining, Smelting and Power Co. Limited.—Mining and milling operations were carried on continuously by the company during 1944 at its property located at Copper Mountain. The company milled 1,383,296 tons of ore for the production of 41,217 dry tons of copper concentrates containing approximately 5,891 ounces gold; 155,406 ounces silver, and 22,652,000 pounds copper. Concentrates produced in 1944 were shipped to a smelter located at Tacoma, Washington, U.S.A.

Twin "J" Project—Wartime Metals Corporation operated at the Twin "J" mine, Duncan, until May 17, 1944. Ore mined and milled totalled 17,341 short tons for a production of 860 tons of copper concentrates and 1,500 tons of zinc concentrates. The copper concentrates contained 671 ounces gold; 16,777 ounces of silver and 322,232 pounds copper. Zinc concentrates shipped totalled 2,409 tons containing 2,338,517 pounds of zinc. Both copper and zinc concentrates were shipped to plants in the United States.

Table 74.—Employees, Salaries and Wages in the Copper-Gold-Silver Mining Industry in Canada, by Provinces, 1944*

Province	Number of employees							Salaries	Wages	
	On Salary		Wage-earners							Total employees
			Surface		Under-ground	Mill				
	Male	Female	Male	Female		Male	Female			
Quebec	107	20	488	4	1,021	215	17	1,872	363,750	3,284,345
Ontario	7	22	22	31	31	14	7	74	24,981	149,139
Manitoba	73	19	230	41	421	80	7	871	277,871	1,613,864
Saskatchewan	186	53	459	77	410	114	36	1,335	651,944	2,312,498
British Columbia	135	22	190	23	371	266	16	1,023	443,298	1,588,381
Canada	508	114	1,389	145	2,254	689	76	5,175	1,761,844	8,948,227

* Not including smelters and refineries.

Table 75.—Wage-earners, by Months, in the Copper-Gold-Silver Mining Industry in Canada, 1944*

Month	Surface		Under-ground	Mill		Total
	Male	Female		Male	Female	
January.....	1,501	140	2,732	709	80	5,162
February.....	1,496	143	2,655	706	79	5,079
March.....	1,440	140	2,564	697	75	4,916
April.....	1,404	141	2,425	678	75	4,723
May.....	1,435	142	2,228	680	73	4,553
June.....	1,439	138	2,153	686	73	4,489
July.....	1,481	150	2,055	687	78	4,431
August.....	1,362	150	1,984	696	73	4,265
September.....	1,310	144	1,915	675	77	4,121
October.....	1,299	146	1,988	687	79	4,199
November.....	1,276	148	2,176	687	78	4,365
December.....	1,227	148	2,156	685	76	4,292
Average.....	1,389	145	2,254	689	76	4,553

* Smelter employees not included.

Table 76.—Specified Data Relating to the Copper-Gold-Silver Mining Industry
1929-1944*

Year	Wage- earners	Wages paid	Average per capita wages paid	Salaried employees	Salaries paid	Total salaries and wages
	No.	\$	\$ (†)	No.	\$	\$
PRODUCING MINES—						
1929.....	3,036	5,465,871	1,800	174	462,268	5,928,139
1930.....	4,634	7,394,741	1,596	195	536,482	7,931,223
1931.....	2,901	4,140,890	1,427	160	465,603	4,606,493
1932.....	2,900	3,392,322	1,170	131	328,079	3,720,401
1933.....	2,590	3,550,417	1,371	123	275,650	3,826,067
1934.....	2,878	4,357,517	1,514	168	413,127	4,770,644
1935.....	2,946	4,144,095	1,407	207	473,988	4,618,083
1936.....	3,328	4,608,774	1,385	308	708,200	5,316,974
1937.....	4,618	7,019,595	1,520	436	1,058,082	8,077,677
1938.....	5,051	7,694,141	1,523	418	1,075,014	8,769,155
1939.....	5,401	8,498,360	1,573	470	1,126,561	9,624,921
1940.....	5,605	9,434,060	1,683	479	1,313,509	10,747,569
1941.....	5,324	9,249,863	1,737	524	1,428,993	10,678,856
1942.....	4,945	9,442,054	1,909	608	1,524,584	10,966,638
1943.....	5,042	9,931,712	1,970	629	1,764,200	11,695,912
1944.....	4,539	8,927,879	1,967	602	1,721,494	10,649,373
Total.....		107,252,291			11,675,834	121,928,125
NON-PRODUCING MINES—						
1929.....	1,777	2,132,279		256	438,337	2,570,616
1930.....	775	1,037,743		90	187,793	1,225,536
1931.....	224	256,204		66	95,620	351,824
1932.....	33	27,439		12	22,787	50,226
1933.....	92	81,998		36	30,713	112,711
1934.....	87	65,485		36	33,672	99,157
1935.....	248	367,685		29	54,428	422,113
1936.....	84	119,084		18	37,267	156,351
1937.....	84	126,155		26	36,782	162,937
1938.....	93	129,246		15	23,064	152,310
1939.....	186	256,999		26	38,671	295,670
1940.....	18	18,746		13	11,512	30,258
1941.....	12	10,449		6	5,718	16,167
1942.....	71	107,532		22	23,242	130,774
1943.....	51	79,818		26	31,097	110,915
1944.....	14	20,348		20	40,550	60,698
Total.....		4,837,210			1,111,053	5,948,263

(*) Not including smelters or refineries.

(†) Including any bonus paid.

Table 77.—Average Annual, Weekly and Hourly Earnings of Male and Female Wage-Earners in the Entire Copper-Gold-Silver Mining Industry, 1939-1944

Year	Average Earnings			Hours worked per week	Average Earnings			Hours worked per week
	Male				Female			
	Annual	Weekly	Hourly		Annual	Weekly	Hourly	
	\$	\$	cents	No.	\$	\$	cents	No.
1939.....	1,567	30.60	61.4	49.8				
1940.....	1,679	31.84	63.3	50.3				
1941.....	1,736	33.88	67.8	50.0				
1942.....	1,904	37.53	77.2	48.6				
1943.....	1,983	38.29	79.1	48.4	1,424	27.51	59.3	46.4
1944.....	1,999	38.90	82.6	47.1	1,313	25.54	55.0	46.4

(*) Data not complete or available prior to 1943.

Table 78.—Dividends Paid by Specified Copper-Gold-Silver Mining Companies

Name of Firm	Dividends paid in 1944	Total dividends paid to December 31, 1944
	\$	\$
Noranda Mines Ltd.....	8,959,088	98,214,012
Waite Amulet Mines Ltd.....	2,640,000	7,920,000
Amulet Dufault Mines Ltd.....	2,112,000	7,744,000
Sherritt Gordon Mines Ltd.....	293,722	2,408,517
Hudson Bay Mining & Smelting Co. Ltd.....	5,515,946	46,885,541
Britannia Mining & Smelting Co. Ltd.....	183,932	11,511,448
Granby Cons. Smelting & Power Co. Ltd.....	135,070	11,802,679

Table 79.—Taxes Paid by the Copper-Gold-Silver Mining Industry in Calendar Years 1943 and 1944

	1943	1944
	\$	\$
Dominion Income Tax, including tax on non-operating revenue.....	4,512,299	3,432,927
Dominion Excess Profits Tax.....	6,147,405	5,731,452
Provincial Tax.....	1,397,691	1,289,936
Municipal Tax.....	163,781	179,045
Grand Total Taxes Paid.....	12,221,176	10,633,360

Table 80.—Specified Expenditures by the Copper-Gold-Silver Mining Industry, 1942, 1943 and 1944

	1942	1943	1944
	\$	\$	\$
Workmen's compensation.....	375,289	423,422	409,782
Silicosis assessment.....	102,965	119,982	86,744
Unemployment insurance.....	79,117	84,818	75,832
Aggregate cost of all supplies purchased.....	9,168,768	9,466,714	6,065,754
Aggregate cost of plant and equipment purchased.....	1,022,614	1,514,959	989,675
Cost of buildings, machinery and equipment erected or installed during year.....	(*)	(*)	1,304,542

(*) Not recorded.

Table 81.—Cost of Prospecting Conducted by the Copper-Gold-Silver Mining Industry, by Provinces, 1943 and 1944

Conducted in—	1943	1944	Conducted in—	1943	1944
	\$	\$		\$	\$
Nova Scotia.....		2,463	Saskatchewan.....		11,128
New Brunswick.....		4,245	British Columbia.....	24,898	22,642
Quebec.....	53,490	34,602	Yukon.....	542	
Ontario.....	56,985	84,935	Northwest Territories.....	500	
Manitoba.....	18,669	36,589	Canada.....	155,084	196,604

Table 82.—Specified Data Relating to the Copper-Gold-Silver Mining Industry, 1929-1944 (†)

Year	Producing mines						Non-producing mines			
	Electricity purchased	Total cost of purchased fuel and power used	Hydraulic turbines used	Process supplies used	Freight on ore, etc., shipped	Smelter treatment charges (*)	Electricity purchased	Total cost of purchased fuel and power used	Hydraulic turbines used	Process supplies used
	k.w.h.	\$	h.p.	\$	\$	\$	k.w.h.	\$	h.p.	\$
1929.....	91,622,530	785,395	9,300	(+)	(+)	(+)	3,155,653	249,738	1,275	(+)
1930.....	124,395,046	1,173,447	9,300	(+)	(+)	(+)	731,964	98,815	690	(+)
1931.....	225,088,928	709,614	9,300	(+)	(+)	(+)	311,800	16,888	1,150	(+)
1932.....	127,331,868	446,736	9,300	(+)	(+)	(+)	1,584,700	16,727	609	(+)
1933.....	68,188,303	387,312	9,300	(+)	(+)	(+)	453,000	17,313	609	(+)
1934.....	90,097,659	526,941	9,300	(+)	(+)	(+)	1,108,500	15,729	.....	(+)
1935.....	91,828,181	520,724	9,300	2,802,443	(+)	(+)	1,108,500	13,428	.....	6,689
1936.....	71,134,263	441,132	9,300	3,127,527	(+)	(+)	2,253,803	54,711	.....	28,698
1937.....	199,045,507	871,002	9,300	4,808,504	344,818	9,735,199	.....	30,086	.....	43,341
1938.....	214,930,438	1,049,325	9,300	4,746,830	960,791	13,639,953	5,501,100	50,959	609	96,833
1939.....	247,180,650	1,203,878	8,900	5,539,545	1,582,350	16,587,402	2,119,520	19,645	1,250	46,071
1940.....	270,601,445	1,297,454	8,900	5,812,178	882,633	17,378,092	.....	.....	.....	.....
1941.....	251,488,789	1,264,533	10,520	5,504,530	1,873,728	25,964,492	.....	34	.....	1,425
1942.....	259,238,497	1,333,969	8,900	5,682,271	1,932,958	26,483,998	108,000	4,768	.....	21,184
1943.....	269,623,279	1,413,989	8,900	5,493,875	1,353,139	21,409,079	.....	12,721	.....	12,840
1944.....	262,411,942	1,401,935	8,900	5,170,105	720,920	16,898,032	.....	308	.....	476
Total.....	2,864,107,415	14,827,386	.....	48,777,808	9,651,337	148,096,247	18,436,540	601,870	.....	257,557

(+) Not available.

(*) Partly conjectural.

(†) Not including smelters or refineries.

Table 83.—Shipments from Copper-Gold-Silver Mines of Canada, 1943 and 1944

—	Quantity	Value	Total metal content as determined by settlement assay (c)				
			Gold	Silver	Copper	Sulphur	Zinc
	tons	\$	fine oz.	fine oz.	pounds	tons	pounds
1943							
13 mines shipped to Canadian plants (a)—							
Ores.....	772, 641	10, 076, 183	148, 995	373, 215	38, 948, 373		
Copper concentrates.....	820, 759	39, 210, 100	320, 512	4, 502, 041	230, 639, 502		
Zinc concentrates.....	181, 032	5, 960, 291	12, 397	310, 210	1, 656, 227		167, 005, 660
Iron pyrites concentrates.....	65, 395	129, 947				32, 116	
Slags, residues and gold precipitates.....	198	1, 518, 423	36, 749	240, 302	151, 001		
12 mines shipped to foreign plants—							
Ores.....							
Copper concentrates (†).....	94, 714	6, 238, 523	20, 410	299, 753	45, 227, 248		
Zinc concentrates.....	131, 418	9, 589, 232	85	3, 797			134, 809, 240
Iron pyrites concentrates.....	219, 181	813, 623				107, 339	
Total.....	2, 285, 338	73, 536, 322	539, 148	5, 729, 318	316, 622, 351	139, 455	301, 814, 900
Value of process supplies, etc. (b)...		29, 695, 643					
Net Value.....		43, 840, 679					
1944							
12 mines shipped to Canadian plants (a)—							
Ores.....	530, 579	7, 438, 664	79, 516	508, 091	35, 392, 376		
Copper concentrates.....	757, 837	33, 233, 915	253, 193	3, 061, 569	204, 189, 160		
Zinc concentrates.....	149, 522	5, 190, 289	8, 318	227, 036	1, 508, 641		137, 386, 498
Iron pyrites concentrates.....	68, 064	142, 617				33, 178	
Slags, residues, bullion, and gold precipitates.....	366	1, 411, 241	34, 625	193, 697	266, 486		
11 mines shipped to foreign plants—							
Ores.....							
Copper concentrates.....	84, 920	5, 676, 914	18, 194	306, 198	39, 940, 660		(d) 943, 067
Zinc concentrates.....	125, 465	8, 837, 074	421	11, 575			128, 873, 442
Iron pyrites concentrates.....	182, 007	352, 405				88, 595	
Copper precipitate.....	570	106, 696	3	69	705, 277		
Total.....	1, 899, 330	62, 389, 815	394, 270	4, 308, 235	282, 002, 600	121, 773	266, 259, 940
Value of process supplies, etc. (b)...		24, 191, 776					
Net Value.....		38, 198, 039					

(†) Includes some copper precipitate.

(a) Certain mines sometimes operated in the Rossland area by several leasers are usually treated, statistically, as one mine.

(b) Includes freight on ore shipments, smelter charges and fuel and purchased electricity.

(c) In addition, cadmium, thallium, tellurium and selenium are recovered from these ores.

(d) Lead.

Table 84.—Ores Mined, Milled, and Concentrates Produced by the Copper-Gold-Silver Mining Industry, 1929-1944

Year	Ore mined	Ore milled	Copper concentrates produced (f)	Zinc concentrates produced	Iron pyrites concentrates produced	Net value of all mine and mill shipments (c)
	tons	tons	tons	tons	tons	\$
1929.....	5,134,824	4,512,806	262,941	.....	76,581	(a) 21,859,907
1930.....	5,768,664	4,926,431	298,085	72,112	53,453	(a) 15,629,564
1931.....	6,002,865	5,243,382	469,059	63,828	63,293	(a) 15,951,103
1932.....	5,453,173	4,607,659	518,609	76,507	71,945	(a) 11,143,759
1933.....	5,448,690	4,521,301	521,399	88,645	59,354	(a) 7,707,270
1934.....	6,065,692	5,127,189	587,045	81,811	80,684	(a) 8,265,071
1935.....	5,650,665	4,693,387	614,942	96,466	66,700	(a) 16,676,447
1936.....	5,052,222	4,091,570	503,650	101,303	105,669	(a) 19,271,965
1937.....	6,749,809	5,802,031	630,664	116,698	201,494	(b) 30,655,784
1938.....	7,929,434	6,961,188	756,065	123,887	173,444	(b) 34,739,439
1939.....	8,474,855	7,760,725	828,963	105,842	161,238	(b) 32,991,716
1940.....	8,931,291	8,325,979	930,622	126,346	172,500	(b) 34,914,051
1941.....	9,263,071	8,402,656	974,250	187,622	309,050	(b) 36,990,853
1942.....	8,575,626 (d)	7,816,813	858,580	264,739	219,874	(b) 40,730,834
1943.....	8,251,579	7,482,831	914,360	315,670	292,007	(b) 50,774,104
1944.....	7,395,608 (e)	6,873,542	870,726	276,737	257,423	(b) 44,770,863
Total 16 years.....	110,148,068	97,149,490	10,539,960	2,098,213	2,364,709	423,072,730

(a) Value f.o.b. mine and presumed gross value less freight and treatment charges which were not reported separately by operators prior to 1937.

(b) Gross value reported by operators less only freight and treatment costs deducted by Dominion Bureau of Statistics.

(c) Includes the value of any cyanide precipitate shipped from mills to smelters.

(d) In addition, 1,554,164 tons of tailings were retreated.

(e) In addition, 1,440,216 tons of tailings were retreated.

(f) Exclusive of copper precipitate in 1943 and 1944.

NOTE.—Values reported for shipments made to smelters operated by the same company are often nominal in nature resulting in annual variations in the distribution of production values between the mining industry proper and the non-ferrous smelting and refining industry. This explains to a considerable extent the apparent incongruities as the value data for 1938-39.

Table 85.—Ore Mined and Milled in the Copper-Gold-Silver Mining Industry, in Canada, by Provinces, 1944

	Manitoba and Saskatchewan	Quebec	British Columbia	Ontario	Canada
	(a)	(b)			
	tons	tons	tons	tons	tons
Ore mined.....	2,853,024	2,387,969	2,002,599	152,016	7,395,608
Ore milled.....	2,821,936	1,892,236	2,007,354	152,016	6,873,542
Copper concentrates produced.....	458,616	324,969	76,178	10,963	870,726
Copper precipitates produced.....	.....	.....	570	.....	570
Pyrites concentrates produced.....	.....	240,370	17,053	.....	257,423
Zinc concentrates produced.....	184,775	90,462	1,500	.....	276,737

(a) In addition, 1,437,216 tons of tailings were retreated.

(b) In addition 3,000 tons of tailings were retreated.

NOTE.—In addition some cyanide precipitate is produced in the recovery of gold from copper-gold ores; this is smelted in the production of blister or anode copper; also the Manitoba-Saskatchewan boundary passes through the Flin Flon mine.

Table 86.—Content (†) of Ores, Concentrates, Etc., Shipped from Copper-Gold-Silver Mines, 1938-1942

	Tons	Content				
		Gold	Silver	Copper	Zinc	Sulphur
		fine oz.	fine oz.	pounds	pounds	tons
To CANADIAN SMELTERS						
1938—						
Copper ore.....	924,236	167,179	470,745	55,558,860		
Copper concentrates.....	606,255	271,099	2,565,893	138,288,971	1,668,410	
Zinc concentrates.....	94,994	8,199	175,391	1,446,591	85,882,822	
Pyrites.....	2,088					1,011
Slag, precipitates, etc.....	234	23,916	129,478	202,519		
1939—						
Copper ore.....	868,328	173,019	440,393	60,333,576		
Copper concentrates.....	616,071	237,742	2,637,965	145,937,499	1,683,442	
Zinc concentrates.....	96,817	7,378	182,517	1,320,610	91,116,593	
Pyrites.....	2,436					1,216
Slag, precipitates, etc.....	595	24,140	133,330	557,781		
1940—						
Copper ore.....	860,237	156,857	372,408	35,648,576		
Copper concentrates.....	768,833	258,692	3,514,614	208,421,117	2,492,666	
Zinc concentrates.....	108,328	5,250	185,406	954,803	102,169,600	
Pyrites.....	36,308					17,619
Slag, precipitates, etc.....	566	23,739	120,970	530,712		
1941—						
Copper ore.....	865,921	159,647	320,994	22,516,954		
Copper concentrates.....	828,622	296,302	4,282,053	240,003,806	3,138,594	
Zinc concentrates.....	135,582	6,263	212,115	1,246,645	125,006,638	
Pyrites.....	94,818					45,446
Slag, precipitates, etc.....	189	28,893	113,299	162,553	68,337	
1942—						
Copper ore.....	760,973	146,412	318,805	28,927,383		
Copper concentrates.....	816,793	342,995	4,700,629	234,276,699		
Zinc concentrates.....	172,519	11,424	293,259	1,409,389	159,543,348	
Pyrites.....	69,014					32,580
Slag, precipitates, etc.....	193	35,146	227,776	129,659		
To FOREIGN SMELTERS						
1938—						
Copper ore.....	850	479	3,191	80,245		
Copper concentrates and precipitates.....	152,995	23,759	476,207	79,978,954		
Zinc concentrates.....	5,966	103	12,577	133,526	6,270,471	
Pyrites.....	42,515					21,316
1939—						
Copper ore.....	108	101	55	5,425		
Copper concentrates.....	177,884	53,866	543,600	84,062,126		
Zinc concentrates.....	30,693			203,969	33,669,569	
Pyrites.....	225,200					113,231
1940—						
Copper ore.....	11	11	949	2,234		
Copper concentrates.....	159,316	39,952	492,352	78,778,442		
Zinc concentrates.....	30,389	456	45,552	444,808	32,558,961	
Pyrites.....	91,457					45,502
1941—						
Copper ore.....	21	5	72	865		
Copper concentrates and precipitates.....	145,549	49,802	430,563	68,313,890		
Zinc concentrates.....	51,983	471	47,051	397,450	57,515,573	
Pyrites.....	208,542					103,762
1942—						
Copper ore.....						
Copper concentrates and precipitates.....	101,752	19,892	283,596	50,619,295		
Zinc concentrates.....	92,135				94,931,818	
Pyrites.....	310,479					150,199

(†) As determined by settlement assay and not necessarily all recovered.

NOTE.—For total estimated values of annual shipments see table 84.

Table 87.—Ore Reserves of Specified Copper-Gold-Silver Mining Companies*

	Tons	Copper	Zinc	Gold	Silver
		per cent	per cent	ounces per ton	ounces per ton
Noranda Mines Ltd., January 1, 1944—					
Indicated above the 2,975 foot level:					
Sulphide ore over 4 per cent copper.....	5,266,000	6.88		0.152	(a)
Sulphide ore under 4 per cent copper.....	15,997,000	0.80		0.192	(a)
Silicious fluxing ore.....	891,000	0.10		0.104	(a)
Capacity of mill: 24 hours.....	3,000				
Waite Amulet Mines Ltd., December 31, 1944—					
Waite Mine—					
Copper ore.....	123,840	4.2		0.04	0.5
Zinc ore.....	25,000		11.0		
Other Waite Amulet orebodies—					
"F" orebody.....	30,000	3.2	9.9	0.01	1.01
"C" shaft orebodies.....	101,000	1.5	10.5	0.02	4.0
Amulet Dufault—					
Lower "A" orebody.....	2,565,615	5.81	4.54	0.045	1.5
Upper "A" orebody.....	141,100	2.0	6.5	0.07	1.6
Capacity of mill: 24 hours.....	1,800				
Normetal Mining Corp. Ltd., December 31, 1944—	(b) 1,380,800	3.56	6.77	0.32	2.39
Capacity of mill: 24 hours.....	750				
Sheritt Gordon Mines Ltd., December 31, 1944—					
East orebody—					
Zinc ore.....	113,000	0.95	9.04	0.006	0.42
Copper ore.....	157,000	2.45	2.93	0.022	0.68
West orebody.....	2,018,000	2.60	2.14	0.019	0.64
Capacity of mill: 24 hours.....	3,000				
Hudson Bay Mining & Smelting Co. Ltd., January 1, 1943.	(c) 27,378,240	2.59	4.16	0.085	1.25
Capacity of mill: 24 hours.....	6,000				
Granby Cons. Mining, Smelting & Power Co. Ltd. 1944..	12,235,000	1.25		(a)	(a)
Capacity of mill: 24 hours.....	4,800				
Britannia Mining & Smelting Co. Ltd.....		Not reported			
Capacity of mill: 24 hours.....	6,000				

(a) Not reported.

(b) In place and broken, before dilution; no allowance for ore below the 2,750 foot level.

(c) Corresponding data for 1944 not available; includes dilution and Emergency Metals Ltd., Emergency Metals Ltd. ceased operations at end of 1944 on exhaustion of ore at Mandy mine.

(*) Subject to revision; from companies' annual printed reports.

Table 88.—Drilling Completed on Copper-Gold-Silver Deposits in Canada, 1943 and 1944

	Footage Drilled	
	1943	1944
Diamond drilling for exploration (testing only)—		
By mining companies with their own personnel and equipment.....	107,867	97,961
By diamond drilling contractors.....	152,284	149,881
Other diamond drilling—		
Blast hole diamond drilling—		
By mining companies with their own personnel and equipment.....	943,486	811,609
By diamond drilling contractors.....	32,042	139,552
Drilling by percussion or other machines.....	(*) 6,166,551	(*) 3,221,786

(*) Not complete as these data are not recorded by some operators.

CHAPTER THREE

THE SILVER MINING INDUSTRY IN CANADA

(a) The Silver-Cobalt Mining Industry; (b) the Silver-Lead-Zinc Mining Industry.

Definition of the Industry.—Silver mining in Canada is not a distinct mining industry inasmuch as silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with cobalt, nickel and arsenia; with lode and placer free gold; in copper-gold and nickel-copper ores, and at Great Bear Lake, N.W.T., with silver-pitchblende. Silver-lead-zinc mining is a very important industry in British Columbia and, to a lesser extent, in the Yukon Territory. In Eastern Canada, lead and zinc ores have been mined in Ontario, Quebec and Nova Scotia.

It is to be noted that, in addition to its recovery from silver-lead ores, zinc is now produced in large quantities from copper-gold-silver ores mined in Quebec, Manitoba and Saskatchewan.

General statistical data contained in this chapter are essentially those pertaining to the mining of silver-cobalt and silver-lead-zinc ores and, to a lesser extent, silver pitchblende ores.

(a) The Silver-Cobalt Mining Industry

The mining of silver-cobalt ores in Canada is confined almost entirely to the district of Temiskaming in northern Ontario. Veins containing these metals were discovered at or near the present town of Cobalt in 1903 and shipments of ores from this area have been continuous since 1904. Depletion and exhaustion of ore reserves during recent years have resulted in a relatively great decline in the production of metals from these deposits. In most instances, operations at properties, some of which were prominent as producers in the past, are conducted by lessees and shipments range from one to several hundred tons. The increased demand for cobalt as an alloying metal has, for some years, stimulated operations of a salvage nature at several of the older mines.

In order to encourage the production of cobalt for war requirements, United States and Canadian government agencies co-operated during a considerable period of the present war in the purchase of Canadian cobalt ores. Ores thus acquired were consigned in 1942 and 1943 to a United States Government agency stock pile located at Deloro, Ontario. These government purchases were discontinued early in 1944.

The only straight custom plant at Cobalt was the old O'Brien 100-ton mill, operated until late in 1943 by C. W. J. O'Shaughnessy. In August of 1943 the concentrating plant at Cobalt of Cobalt Products Ltd. was taken over by Silanco Mining & Smelting Company; this mill was operated in 1944. The Temiskaming Testing Laboratories, recently destroyed at Cobalt by fire, have been rebuilt by the Ontario Department of Mines; this plant renders a valuable service to many operators who depend on it for the sampling, valuation and often marketing of ores. Shipments of cobalt ore were also made since 1942 from a deposit located at Werner Lake, some 40 miles north of Minaki near the Ontario-Manitoba boundary.

The number of operators reported officially as actively engaged in the mining or shipping of silver-cobalt ores in 1944 totalled 10; employees numbered 165 and salaries and wages paid amounted to \$260,575. The gross value of mine and mill shipments totalled \$422,860 and the net value of sales was estimated at \$323,260; these figures include the value of concentrates and ores placed on the stock pile of the Metals Reserve Company located at Deloro, Ontario.

Table 89.—Statistics of the Silver-Cobalt Mines and Mill Operations in Canada (b), 1941-1944

	1941	1942	1943	1944
Number of mines in operation (*).....	14	14	21	11
Ore mined..... tons	11,507	25,550	39,184	27,184
Ore salvaged from surface (e)..... tons	(c)	18,532	395	2,189
Ore treated (milled) (a)..... tons	38,715	43,851	39,625	30,190
Tailings treated..... tons			8,855	
Concentrates produced..... tons	1,396	1,415	1,346	862
Gross value of bullion, ore, concentrates and residues sold..... \$	788,815	(d) 750,250	(d) 721,173	(d) 422,860
Cost of freight..... \$	7,017	1,439	4,192	3,138
Smelter charges..... \$	13,719	16,255	15,361	12,330
Cost of fuel and purchased electricity used..... \$	40,875	68,349	74,691	48,323
Cost of process supplies used..... \$	59,761	64,000	48,068	35,809
Net value of sales..... \$	682,443	600,207	578,861	323,260

(*) All mines located in northern Ontario and includes properties on which the operations consisted only in salvaging of ore from dumps, etc.

(a) Does not include crude ore shipped.

(b) Partly estimated or conjectural as data are unobtainable from some shippers.

(c) Data not available.

(d) Includes value of ore consigned to United States Government stock pile at Deloro, Ontario.

(e) Complete data not available.

Table 90.—Mine and Mill Shipments of Canadian Silver Cobalt Ores and Concentrates in 1944

	Gross Weight	Metal Content			
		Silver	Cobalt	Nickel	Copper
	lb.	oz.	lb.	lb.	lb.
To Canadian smelters and to Government stock pile at Deloro, Ontario.....	1,734,460	489,614	176,813	43,424	16,678
To foreign plants.....	183,143	2,216	25,951	6,006	710
Total.....	1,917,603	491,830	202,764	49,430	17,388

Table 91.—Employees, Salaries and Wages in the Silver-Cobalt Mining Industry in Canada, 1944

	Number	Salaries and wages
		\$
SALARIED EMPLOYEES—		
Total.....	(a) 24	43,960
WAGE-EARNERS—		
Surface.....	(b) 43	216,615
Underground.....	74	
Mill.....	24	
Total.....	141	216,615
Grand Total.....	165	260,575

(a) Includes 4 females.

(b) Includes 1 female.

Table 92.—Number of Wage-Earners on Payroll or Time Record at End of Month in the Silver-Cobalt Mining Industry, 1940-1944

Month	1940	1941	1942	1943	1944			
					Mine			Mill
					Surface		Under-ground	
					Male	Female	Male	Male
January.....	63	140	144	170	41	.....	64	22
February.....	72	144	109	179	42	.....	64	10
March.....	79	159	115	181	39	.....	72	10
April.....	84	97	141	177	44	.....	77	27
May.....	122	139	179	191	50	1	79	29
June.....	138	146	183	181	51	1	76	31
July.....	144	186	200	176	50	1	74	29
August.....	133	193	200	174	48	1	71	30
September.....	128	181	195	216	33	1	72	27
October.....	127	184	180	167	40	1	68	27
November.....	88	161	172	185	36	1	74	31
December.....	74	154	150	145	33	1	83	28

(b) The Silver-Lead-Zinc Mining Industry

In 1944 the silver-lead-zinc mining industry of Canada reported 20 operators or firms as being actively engaged in the mining, exploration or development of silver-lead-zinc deposits, and of these operators 17 reported commercial shipments during the year under review. Employees numbered 2,769 and salaries and wages paid amounted to \$5,810,290. The cost of explosives and other process supplies consumed totalled \$1,752,087 and fuel and electricity used was recorded at \$860,231. The gross value of production, as reported by the entire industry, totalled \$21,291,957 and the net value of same was estimated at \$16,802,759.

A report prepared by the Lands, Parks and Forests Branch of the Department of Mines and Resources, Ottawa, contains the following information relating to lode mining in the Yukon in 1944:

"The only production from lode mining has been in the Mayo District. A very small tonnage of high-grade silver-lead ore was shipped in 1944.

"Considerable interest was shown in prospecting for lode during 1944. The Consolidated Mining and Smelting Company, International Nickel, Pioneer and Bralorne Companies, and Hudson's Bay Mining and Smelting Company all had engineers and prospectors in the areas adjacent to the Alaska Highway, Canol Access Road, Haines Cut-Off Highway and Airport Access roads.

"There was some prospecting for lode in the Dawson District.

"New locations in the Territory for which Quartz Mining Grants were issued were as follows:

Whitehorse Mining District.....	78 Claims
Dawson Mining District.....	93 "
Mayo Mining District.....	20 "
Total.....	191 Claims

Renewals of Quartz Claims were: Whitehorse District 26; Dawson District 117; Mayo 264, and in addition 132 claims were held in the Mayo District under 21-year leases.

"The Territorial Assay Office at Keno was kept busy making assays for individual prospectors for which no charge is made."

The annual report "Lead in 1944", as prepared by the Bureau of Mines, Ottawa, contains the following information:

"In British Columbia the lead and zinc concentrates produced in the 8,000-ton concentrator of the Sullivan mine are shipped by rail 185 miles to the company's smelter and refinery at Trail. A total of 2,141,400 tons of ore was milled in 1944, a decrease of about 15 per cent compared with 1943. The grade of ore treated was also lower, due largely to the cleaning out of stope bottoms in preparation for filling, and to the curtailment of development work in the early years of the war so that greater attention could be given to production.

"Western Exploration Company at Silverton produced zinc and lead concentrates for export.

"Reco Mountain Base Metal Mines, Limited, near Sandon, operated the renovated Noble Five concentrator until May, when the plant was destroyed by fire.

"Retallack Mines, Limited, at Retallack, completed the renovation of its 300-ton mill in April. A contract for sale of the zinc concentrate, made in December, 1943, with United States Commercial Company, a United States Government subsidiary company, was replaced in April, 1944, by a contract for the sale of lead and zinc concentrates to American Smelting and Refining Company in the United States.

"The Kootenay Florence mine at Ainsworth was operated by Wartime Metals Corporation as the Kootenay Florence Project from early in 1943 until May, 1944, when the contract for sales to Metals Reserve Company (United States) was cancelled.

"Base Metal Corporation's power house was destroyed by fire in January and as a result there was no production from the company's Kicking Horse zinc-lead mine at Field from then until June 12. The mine was in continuous production during the remainder of the year, and until near the end of November, when a small crew was placed in the Monarch zinc-lead mine, also at Field, to complete salvage operations. The company's concentrator treated an average of 122 tons a day during the period of regular operation, compared with a daily average of 169 tons in 1943. Development work was carried on at the Kicking Horse mine during the time that production was suspended.

"The Tyee zinc-lead-copper property, near Chemainus, Vancouver Island, was in production until May when the contract with Metals Reserve Company was cancelled. The property was acquired in 1942 by Twin "J" Mines, Limited, and was operated by the company under the supervision of Wartime Metals Corporation. Zinc, lead, and copper concentrates were produced in the 125-ton mill. The Reeves McDonald zinc-lead mine on the Pend-d'Oreille River remained idle in 1943.

"Several small lead-zinc properties, mainly in the Ainsworth-Slocan area shipped crude ore to the Trail Smelter.

"In Ontario, Lake Geneva Mining Company's property in Hess township, Sudbury district, was operated by Wartime Metals Corporation. The sales contract with Metals Reserve Company was cancelled, effective April 30, and operations ceased near the end of May, following which the plant was dismantled and sold.

"In Quebec, New Calumet Mines, Limited, with mine and 500-ton concentrator at Calumet Island, Pontiac county, operated at capacity. The lead and zinc concentrates are shipped to American smelters designated by Metals Reserve Company, with which New Calumet has a contract.

"The Tetreault property near Notre-Dame-des-Anges, Portneuf county, was operated by Siscoe Gold Mines, Limited, under the general supervision of Wartime Metals Corporation until May, when activities were discontinued. The lead and zinc concentrates were sold under contract to Metals Reserve Company.

"Aldermac Copper Corporation, Limited equipped its property at Moulton Hill, 4 miles from Sherbrooke, with a complete mining plant and a 250-ton concentrator, which was put into operation on July 15. The mill produces lead, copper, and zinc concentrates for shipment to the United States. In due course, a pyrites concentrate may also be produced. The ore contains appreciable amounts of gold and silver."

Table 93.—Ore Mined and Milled in the Silver-Lead-Zinc Mining Industry in Canada, 1943 and 1944

		Yukon and Northwest Territories	British Columbia	Quebec and Ontario	Canada
1943—Ore mined.....	ton	37,371	2,708,886	506,400	3,252,657
Ore milled.....	ton	32,186	2,714,329	499,380	3,245,895
Concentrates produced—Lead.....	ton		292,407	5,383	297,790
Zinc.....	ton		331,563	55,894	387,457
Pitchblende-silver.....	ton	(*)			(*)
Gold precipitate.....	ton			20	20
1944—Ore mined.....	ton	101	2,359,839	551,884	2,911,824
Ore milled.....	ton		2,355,675	549,891	2,905,566
Concentrates produced—Lead.....	ton	4	201,417	9,831	211,252
Zinc.....	ton		286,754	64,763	351,517
Pitchblende-silver.....	ton	(*)			(*)
Gold precipitate.....	ton			18	18

(*) Data not available for publication.

Table 94.—Destination of Shipments From Silver-Lead-Zinc Mines of Canada, 1943 and 1944

	Tons shipped	Gross value at shipping point	Total metal content as determined by settlement assay			
			Gold fine oz.	Silver fine oz.	Lead pounds	Zinc pounds
1943		\$				
To Canadian smelters—						
Lead ore.....	3,033	178,543	481	341,528	193,202	11,483
Lead concentrates (†).....	308,379	15,246,727	37	6,630,217	406,083,211	30,559,105
Pyrites concentrates.....	509	19,245	471	6,054		
Zinc concentrates.....	306,769	6,253,860	13	620,190	28,129,985	303,830,945
Dry ore.....	1,899	31,685	408	54,674	29,926	60,212
Total.....	620,589	21,730,060	1,410	7,652,663	434,436,324	334,461,745
To Foreign smelters—						
Lead ore.....	228	41,341	3	57,442	266,853	
Lead concentrates.....	8,268	937,075	7,600	492,222	10,289,890	235,785
Zinc concentrates (*).....	82,627	3,751,444	86	283,606	145,593	90,270,160
Gold precipitate.....	20	612,962	10,408	378,797		
Total.....	91,143	5,342,822	18,097	1,212,067	10,702,336	90,505,945
Grand Total (gross).....		27,072,882				
Cost of freight.....		1,655,637				
Cost of fuel and purchased electricity.....		986,519				
Smelter charges.....		453,715				
Cost of process supplies.....		2,044,367				
Net Value.....		21,932,644				
1944						
To Canadian smelters—						
Lead ore.....	1,440	131,446	110	292,413	162,521	16,920
Lead concentrates.....	202,014	9,204,664		4,087,122	272,917,775	21,932,674
Pyrites concentrates.....						
Zinc concentrates (*).....	256,303	5,218,329		535,010	27,172,583	247,806,425
Dry ore.....	700	37,415	494	48,814	20,465	27,071
Total.....	460,457	14,681,854	604	4,963,359	300,273,344	269,783,090
To Foreign smelters—						
Lead ore.....	97	19,045	2	26,976	106,144	
Lead concentrates.....	15,178	1,192,527	3,562	1,094,099	15,294,423	
Zinc concentrates (*).....	96,029	4,831,603	47	93,490	47,078	106,422,436
Gold precipitate.....	18	566,928	9,940	376,353		
Total.....	111,322	6,610,103	13,551	1,590,918	15,447,645	106,422,436
Grand Total (gross).....		21,291,957				
Cost of freight.....		1,070,103				
Cost of fuel and purchased electricity.....		860,231				
Smelter charges.....		806,777				
Cost of process supplies.....		1,752,087				
Net Value.....		16,802,759				

(*) Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia.

(†) Includes shipments of silver-pitchblende concentrates from Northwest Territories. Information relating to content of pitchblende is not available for publication.

NOTE.—In addition to the metals contained in shipments listed in Table above, there are considerable quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia. Cadmium, bismuth, antimony, tin and sulphur are also recovered from these ores (silver-lead-zinc).

Table 95.—Drilling Completed on Silver-Lead-Zinc Deposits in Canada, 1943 and 1944

	Footage Drilled	
	1943	1944
Diamond drilling for exploration and testing—		
By mining companies with their own personnel and equipment.....	5,591	1,283
By diamond drilling contractors.....	64,425	86,466
Other diamond drilling—		
Blast hole diamond drilling:		
By mining companies with their own personnel and equipment.....		
By diamond drilling contractors.....	96,963	280,447
Drilling by percussion or other machines.....	(*) 1,871,957	(*) 2,660,574

(*) Not complete as records are unobtainable at certain mines.

Table 96.—Employees, Salaries and Wages in Silver-Lead-Zinc Mining Industry, 1944

Province	On salary		Mine			Mill		Total	Salaries and wages
			Surface		Under-ground				
	Male	Female	Male	Female		Male	Female		
									\$
Quebec.....	49	10	151	7	403	94		714	1,350,153
Ontario.....	11	1	4		17	5		38	75,626
British Columbia.....	258	45	387	14	938	337	38	2,017	4,384,511
Yukon.....	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Canada.....	318	56	542	21	1,358	436	38	2,769	5,810,290

(a) No data available; work done under lease.

Table 97.—Number of Wage-Earners, by Months, in the Silver-Lead-Zinc Mining Industry, 1943 and 1944

Month	1943	1944				
	Total	Mine			Mill	
		Surface		Under-ground	Male	Female
		Male	Female			
January.....	2,484	600	13	1,524	485	33
February.....	2,560	576	13	1,548	479	33
March.....	2,533	557	15	1,469	481	34
April.....	2,522	598	16	1,368	467	36
May.....	2,568	592	16	1,336	456	42
June.....	2,725	571	24	1,266	431	41
July.....	2,790	542	24	1,271	425	40
August.....	2,780	547	25	1,218	418	39
September.....	2,730	498	25	1,223	402	41
October.....	2,790	487	25	1,249	397	41
November.....	2,946	469	23	1,401	395	39
December.....	2,827	457	25	1,403	399	39
Average.....	2,690	542	21	1,358	436	38

Table 98.—Taxes Paid in 1943 and 1944 by Canadian Silver-Lead-Zinc Mining and Smelting Companies (*)

Tax Paid	1943	1944
	\$	\$
Dominion income tax.....	2,207,043	997,482
Dominion excess profits tax.....	3,690,312	1,068,459
Provincial tax.....	599,927	448,265
Municipal tax.....	167,201	270,278
Other.....	1,580	14,955

(*) Subject to revision.

Table 99.—Total Cost of Prospecting Conducted in Provinces by Silver-Lead-Zinc Mining and Smelting Companies, 1944

	\$		\$		\$
N.S.....	2,463	Ont.....	48,820	B.C.....	127,916
N.B.....	4,245	Man.....	5,738	Yukon.....	33,370
Que.....	28,276	Sask.....	9,605	N.W.T.....	43,493
Total.....					303,926

NOTE.—Prospecting includes the search for new mineral deposits on the surface and preliminary exploration.

Table 100.—Other Expenditures by the Silver-Lead-Zinc Mining and Smelting Companies

	1944
	\$
Workmen's compensation.....	276,400
Silicosis assessment.....	160,483
Unemployment insurance.....	104,001
Aggregate cost of all supplies purchased.....	3,478,930
Aggregate cost of plant and equipment purchased.....	479,593
Cost of buildings, machinery and equipment erected or installed during the year.....	422,288

ARSENIC

Canadian production of arsenic (As_2O_3) during 1944 from domestic ores totalled 2,627,022 pounds valued at \$180,866 compared with 3,153,538 pounds worth \$254,009 in 1943. The output in 1944 consisted entirely of refined arsenic, of which 2,268,067 pounds valued at \$153,944 represented recoveries from auriferous quartz ores mined in the province of Quebec; refined arsenic was produced in that province at the Beattie gold mine and crude arsenic produced at the O'Brien mine was refined by the Deloro Smelting and Refining Co. Ltd. at Deloro, Ontario; the balance of Canadian output in 1944 consisted of refined arsenic produced at the Deloro smelter from Ontario silver-cobalt ores. In addition to the arsenic recovered from Quebec and Ontario ores, there is a very considerable quantity of arsenic contained in auriferous quartz ores exported to the United States from British Columbia mines; no data are available on the possible recovery of this arsenic, and the Canadian gold mines receive no payment for any part of the arsenic content; it is therefore not credited as commercial production. Deposits containing arsenopyrite in association with gold occur in various other parts of Canada.

The following information is from the annual 1944 report on Arsenic as prepared by the United States Bureau of Mines:

"Roughly, three-quarters of the consumption of white arsenic has been for the preparation of agricultural insecticides used mainly to combat the cotton boll weevil, the codling and gypsy moths that cause widespread damage to apples and pears, and as herbicides. Of the remainder, the glass industry is the largest user. For the immediate future a good market for all probable United States output of arsenic at or near the current price level seems assured, especially as world needs for foods and fibres will be at a high level. The major one of price will be determined by the cost of imported arsenic and its relation to the cost of the by-product material obtained principally in copper and lead smelting. After Atlantic shipping becomes available, prices cannot be expected to rise substantially because of the huge stocks of arsenic that have accumulated in Sweden as a by-product from the treatment of the Boliden copper-gold-silver ores. The wartime development of effective new organic insecticides, such as DDT, may be strong competitors of arsenicals, although not yet sanctioned for commercial use."

The principal arsenic producing countries are: United States, Mexico, Sweden, France, Belgium, Australia, Japan, Brazil and Canada. Complete data on world production of arsenic are not available at present.

Arsenic is used chiefly in the manufacture of insecticides. It is also used in the preparation of weed killers, sheep and cattle dip, wood preservatives, and in the manufacture of glass, minor uses being in pigments, tannery supplies, and pharmaceutical preparations. Arsenic salts are used to replace creosoting in the preservation of wood. The use of arsenic to manufacture chemical warfare materials has notably increased its consumption. Calcium arsenate and, to a much lesser extent, lead arsenate are the arsenicals ordinarily used in insecticides. Paris green, which is a copper acetoarsenite, is also used as an insecticide. Magnesium arsenate and manganese arsenate have also been used for this purpose. A considerable tonnage of white arsenic, in the form of crude arsenic or as sodium arsenite is used in the manufacture of weed killers. High-grade white arsenic is used in glass as a decolorizer, opacifier and refining agent. Small quantities of arsenic are used in the paint industry, as realgar or arsenic disulphide (As_2S_2) and as orpiment or arsenic trisulphide (As_2S_3).

Although the world consumption of white arsenic has varied greatly during the past ten years, the quoted price remained steady at $3\frac{1}{2}$ cents a pound up to the middle of 1941. As most of it is a by-product of metal recovery, through necessity rather than choice, and as the potential supply is far in excess of any normal demand, there seems to be little likelihood of any sustained increase in price. The New York price remained fixed at 4 cents a pound since 1942. The Canadian price of white arsenic, as given by Canadian Chemistry & Process Industries in May 1945 was $7\frac{3}{4}$ to $8\frac{1}{4}$ cents per pound.

Table 101.—Production in Canada, Imports and Exports of Arsenic, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	Pounds	\$	Pounds	\$
PRODUCTION—				
White arsenic.....	3,153,538	254,009	2,627,022	180,866
IMPORTS—				
Arsenic acid.....	(a)	(a)	4,202,829	156,652
White arsenic (arsenious oxide) (b).....	400	124	2,405	1,749
Sulphide of arsenic (b).....	3,373	1,123		
Soda, arseniate of, binarsenate.....	83,329	18,712	86,475	24,488
Arsenate of lead.....	4,432	484		
Arsenate of lime.....	9,664	665		
Total.....		21,108		182,889
Exports—Arsenic—Total.....	6,617,100	353,484	5,997,500	306,891

(a) Not classified separately prior to 1944.

(b) Data combined in 1944.

Table 102.—Consumption of Arsenious Oxide and Arsenic Acid in the Manufacture of Canadian Insecticides, 1932-1944

Year	Pounds	\$	Year	Pounds	\$
1932.....	1,721,044	69,250	1939.....	4,287,435	132,584
1933.....	3,116,401	110,011	1940.....	3,607,444	122,265
1934.....	4,709,443	168,185	1941.....	5,707,499	212,687
1935.....	2,736,089	86,983	1942.....	6,106,887	273,919
1936.....	3,368,956	106,132	1943.....	4,807,049	211,998
1937.....	3,296,559	102,651	1944.....	4,697,120	208,976
1938.....	3,029,145	93,873			

NOTE.—In addition, the following calcium arsenate was used: 1940, 342,452 pounds valued at \$21,671; 1941, 509,381 pounds at \$34,704; 1942, 394,978 pounds worth \$26,773; 1943, 383,059 pounds at \$26,373, and 597,741 pounds at \$40,345 in 1944.

COBALT

Output of Canadian cobalt comes entirely from cobalt-bearing deposits located in northern Ontario and usually includes the cobalt recovered and sold in the metallic state, the cobalt content of oxides and salts sold and the metal content of cobaltiferous ores exported. No cobalt metal, oxides or salts were produced in Canada from Canadian ores in either 1943 or 1944, and the 36,283 pounds valued at \$34,106 credited as Canadian cobalt production during the year under review, represents the metal content of Canadian ores exported. Included in these exports is the cobalt content of ores and concentrates reshipped from the stock pile of the Metals Reserve Company, located at Deloro, Ontario. Ores placed on this stock pile are not credited as commercial production until reshipped from Deloro.

Deloro Smelting and Refining Company, Limited, has the only plant in Canada that treats ores for the recovery of cobalt. The plant is located at Deloro, Ontario, and produces cobalt metal, oxides, and salts, chiefly for the British market. For the past three years the company has been treating cobalt residues from Africa and has processed little or no Canadian ores. The Canadian production of cobalt ore from 1942 to 1944 was largely purchased by Deloro Smelting and Refining Company as agent for the Department of Munitions and Supply, acting for Metals Reserve Company of the United States, and was stockpiled for this account. The purchase of these ores for the Metals Reserve Company was discontinued February 22, 1944.

In the United States, most of the cobalt produced is obtained from cobalt residues imported from Africa. These are converted to metal at Niagara Falls, N.Y., and to oxide at New Brighton, Wilmington, and Canonsburg, in Pennsylvania, and at Cleveland, Ohio.

The total annual world output is estimated to approximate 6,000 metric tons. The greater part of the world's requirements are now supplied from the extensive deposits of the Belgian Congo and Northern Rhodesia, the remainder being contributed mainly by India, French Morocco, and Canada. Other producing countries are Australia, Japan, Germany, and Russia.

The Bureau of Mines, Ottawa, reported recently that about 75 per cent of the world production of cobalt is used in the metallurgical industry and most of the remainder in the ceramic industry. The metallurgical uses are for high-speed cutting steels; for making stellite or stellite-type alloys, which contain 45 to 50 per cent cobalt, 30 to 37 per cent chromium, and 12 to 17 per cent tungsten. There are various modifications of this composition, but all contain high percentages of cobalt. Stellite is used for cutting metals at high speed and for making permanent magnets. The use of stellite continues to spread and it is of great value in the manufacture of valves for aeroplane engines. Small quantities of cobalt used with other chemicals in nickel-plating solutions are said to produce a bright nickel electro deposit as an undercoating for later chromium plating. A certain amount of cobalt is used in electroplating and as a catalyst. Cobalt oxide is used mainly in the ceramic industry owing to its fine colouring properties. Other compounds of cobalt are used as driers in paints and varnishes.

Consumption of cobalt, chiefly in the production of high-speed cutting tools and permanent magnets, increased substantially during the war years.

The price of cobalt has remained fairly steady in recent years. The nominal New York price for cobalt metal remained at \$1.50 a pound and for black oxide for the ceramic industry

\$1.85 a pound. The nominal Canadian price for cobalt ore, 10 per cent grade, f.o.b. cars, Ontario, was approximately \$0.94 a pound of cobalt in 1944.

Since 1904, the first year for which cobalt production was recorded in Canada, there were produced, to the end of 1944, in all forms, 34,417,386 pounds of Canadian cobalt valued at \$33,726,917.

A detailed investigation was made recently, by the University of British Columbia, of deposits of cobalt ore which have been known for years to exist on Nickel Plate Mountain and at the Little Gem mine; an average concentrate from the Kelowna Exploration Company's mill averaged 0.88 per cent cobalt.

COBALT-SILVER ORES DURING 1944

(A. A. COLE, Manager, Temiskaming Testing Laboratories, Cobalt, Ontario)

In July 1942 the United States Government, through a subsidiary purchasing agency (Metals Reserve Company), completed a contract with the Canadian Government through a similar Canadian purchasing agency (War Supplies Limited) for the purchase of cobalt ores for stock-piling purposes. The first shipment of cobalt ore left Cobalt on this contract in July 1942. This contract was operating during the year 1943 and the year 1944 opened with the market for cobalt ore active, as all cobalt ore purchased was immediately absorbed by this contract at a good price. The contract terminated on the 22nd February 1944 and by that date every available pound of cobalt ore had been shipped from the district.

The uncertainty as to the intentions of the United States Government regarding the stock-pile of accumulated cobalt ore unsettled the market to such an extent that a number of operators closed their mines till the market was more settled. This is reflected in the fact that only one car of cobalt ore was shipped from Cobalt during the balance of the year. It went to the Shepherd Chemical Co., Cincinnati, Ohio, U.S.A. The year closed with the market still uncertain.

Ores of the Cobalt District.—The metals contained in the ores from this district are principally cobalt and silver, with sometimes payment also being made for nickel. The silver content varies from zero up to several thousand ounces per ton. But for contract purposes the ores are generally divided into silver ores and cobalt ores, an arbitrary point of division being chosen. Ores containing 500 ozs. silver per ton or over are called silver ores.

Cobalt ores.—Cobalt ores to be marketable have to assay at least 8 per cent cobalt, but the average of the shipments that have been made will run about 10 per cent. The movement of cobalt ores during 1944 has been covered in the above paragraph.

Silver ores.—The main producer of silver ore during the year was the Cross Lake Lease, whose ore for the most part was crude ore and not concentrates. The other shipper of importance was the Ausic Mining & Reduction Co., working its own mill on the Silver Cliff Property, the mill-feed being obtained mostly from the Genesee Mine.

Since the Deloro Smelting & Refining Co., of Deloro, Ontario gives the most attractive contract for silver-cobalt ores, all the silver ores shipped from the district go to Deloro. As the aggregate shipments are small, the Deloro Company only runs its silver smelter when sufficient ore is accumulated to make the run worth while. This amount they set at 300 tons. A furnace run was made early in 1944 and the next run was a year later in March, 1945.

COBALT 1944

(United States Bureau of Mines)

The United Nations did not lack supplies of cobalt in 1944. Indeed with the output of Finland available, the United Nations control virtually the entire world cobalt supply, except that of Burma (1944). On the other hand, with Germany's loss of cobalt production from French Morocco in 1943 and Finland in 1944, its remaining source of supply was limited to a small domestic output. Presumably, Japan was in a more favourable position than Germany with respect to cobalt because of a small domestic output and the Burmese production.

However, Burmese speiss, which is obtained by smelting lead ore, is difficult to refine. In the United States, despite the fact that cobalt was free from allocation and that imports were 32 per cent less than in 1943, available supplies were more than adequate for requirements in 1944. Maximum prices for cobalt metal, fines, powder, oxides and other alloys and compounds established by the Office of Price Administration on November 2, 1943, continued in effect in 1944. The maximum price for metal containing 97 per cent cobalt was fixed at \$1.50 to \$1.57 a pound on contract and \$1.60 to \$1.67 on spot sales. The maximum prices for other cobalt products were the highest charged by the seller on a delivery made during January, February or March 1942. Cobalt ores, concentrates and crudes are exempt from the provisions of the price regulation. Production of cobalt ore in the United States was 13 per cent greater in 1944 than in 1943, but shipments were 27 per cent less. The Bethlehem Steel Co., Bethlehem, Pa., was again the chief producer, but during the last quarter of 1944 it was exceeded by the St. Louis Smelting and Refining Co., Fredericktown, Mo., which began producing cobalt commercially at its property near Fredericktown, Mo., in July 1944; the complex ore yields a lead concentrate, a copper concentrate containing some lead, and a nickel-cobalt concentrate. Production by the Bethlehem Steel Company represents the cobalt (averaging 1.37 per cent in 1944) contained in the sulphides that accompany the magnetite mined at Cornwall, Pa. Belgian Congo has been the chief source of cobalt imports into the United States; in 1944 it supplied 8,500,516 pounds in the form of an alloy containing 3,737,000 pounds of cobalt.

Table 103.—Production of Domestic Cobalt in Canada, 1935-1944

Year	Pounds	Year	Pounds
1935.....	681,419	1940.....	794,359
1936.....	887,591	1941.....	263,257
1937.....	507,064	1942.....	(*) 83,871
1938.....	459,226	1943.....	(*) 175,961
1939.....	732,561	1944.....	(*) 36,263

(*) Exclusive of cobalt in ores placed on United States Government stock pile at Deloro, Ontario, but includes metal in ores reshipped from this stock pile.

Table 104.—Production in Canada From Domestic Ores, Imports and Exports of Cobalt, 1943 and 1944

	1943		1944	
	Quantity	\$	Quantity	\$
PRODUCTION (In terms of metallic cobalt and cobalt in oxides and salts sold and in ores exported) pounds	(*) 175,961	191,407	(*) 36,283	34,106
IMPORTS—Cobalt ore..... pounds	2,236,300	785,721	3,676,400	1,327,755
Oxide of cobalt..... pounds	55	130	1,720	2,595
EXPORTS—Cobalt, contained in ore..... pounds	163,100	188,510	25,900	24,379
Cobalt, metallic..... pounds	911,107	1,507,635	1,009,068	1,665,984
Cobalt, alloys..... pounds	214,202	1,021,663	176,589	789,202
Cobalt oxides and cobalt salts..... pounds	67,040	135,630	462,656	829,469

(*) Exclusive of cobalt in ores placed on United States Government stock pile at Deloro, Ontario, but includes metal in ores reshipped from this stock pile.

Table 105.—Cobalt Salts Used in the Manufacture of Canadian Pigments and Paints, 1932-1944

Year	Pounds	\$	Year	Pounds	\$
1932.....	17,021	10,960	1939.....	52,979	21,638
1933.....	10,885	7,463	1940.....	89,332	28,111
1934.....	26,300	14,069	1941.....	74,445	39,349
1935.....	110,419	33,292	1942.....	200,228	145,433
1936.....	170,932	43,230	1943.....	179,995	75,233
1937.....	37,258	17,062	1944.....	182,437	78,554
1938.....	43,703	17,993			

WORLD PRODUCTION

(U.S. Bureau of Mines)

As cobalt production data for many countries are lacking, it is impossible to prepare an accurate statement of present world output. The following table shows world production by countries in 1938 in so far as statistics are available.

Table 106.—

Country (a)	Cobalt-bearing Material	Cobalt Content
		metric tons
Australia.....	Cobalt ore.....	(b)
Belgian Congo.....	Cobalt alloy.....	1,532
Bolivia (exports).....	Cobalt ore.....	
Burma.....	Cobaltiferous nickel speiss.....	(c) 238
Canada.....	Cobalt ores, oxide, and metal.....	208
Morocco, French.....	Cobalt ore.....	720
Northern Rhodesia.....	Cobalt alloy.....	(c) 1,073
United States.....	Cobalt ore.....	(d)

(a) In addition to countries listed, Brazil, Chile, China, Finland, Germany, Italy, Japan and Mexico produce cobalt, but production data are not available.

(b) Data not available.

(c) Year ended June 30 of year stated.

(d) Bureau of Mines not at liberty to publish figures.

SILVER

Production of fine new silver from all types of Canadian ores totalled 13,627,109 troy ounces valued at \$5,859,656 in 1944 compared with 17,344,569 troy ounces worth \$7,849,111 in 1943. The average estimated price of the fine metal in Canadian funds was 43 cents per troy ounce in 1944 as against 45.254 cents in 1943. Of the total Canadian production in 1944, the mines of British Columbia contributed 5,631,572 ounces, Ontario 3,143,275 ounces, Quebec 2,500,681 ounces, Saskatchewan 1,735,773 ounces, Manitoba 569,873 ounces, with lesser quantities from Yukon, Northwest Territories and Nova Scotia. The greatest annual production of silver in Canada occurred in 1910 in which year an output of 32,869,264 fine ounces was recorded; the highest average annual Canadian price per fine ounce for silver was 111.122 cents in 1919. Production of silver in Canada since 1887, the first year for which data are available, to the close of 1944, totalled 880,919,928 troy ounces valued at \$494,565,826.

The following information is taken from the review of the 1944 silver market by Handy & Harman, New York:

"For the fifth successive year the silver markets of the world have operated under governmental control. Price ceilings, import and export embargoes and exchange restrictions created artificial conditions in silver dealing everywhere, but this was necessary in order that the white metal might function to best advantage in the war effort. As in 1943 the London spot and forward quotations were pegged at 23½d. throughout the year. . . . While rigid stabilization of silver at a fixed level was not attempted in India, nevertheless the authorities exercised considerable price control in a market which was extremely sensitive and subject to wide fluctuations; industrial consumption of silver in India is practically nil. Therefore that country's absorption of silver represents merely the peoples' desire to accumulate a store of value. . . . The United States OPA import price ceiling of 45 cents per ounce was maintained, but imports declined as compared with 1943. Nevertheless, supplies of foreign origin were more than sufficient to meet requirements for the uses specified by the War Production Board. . . . During 1944 less than 200,000 ounces of the United States silver production were acquired by the U.S. Treasury Department under the Domestic Silver Purchase Act of 1939; all the rest of such newly mined metal was bought by industry for civilian purposes as permitted by the War Production Board. . . .

"United States Treasury disposals during the eleven-month period were comprised as follows: the minting of 'silver' nickels accounted for 8,489,000 ounces; sales under the Green Act absorbed 43,672,000 ounces; lend-lease procedure made 202,807,000 ounces available to foreign governments, a total of 255,000,000 ounces. The governments receiving lend-leased silver were Australia, Ethiopia, Great Britain, India, the Netherlands and Saudi-Arabia. There were 1,175,700,000 ounces of silver pledged as backing for U.S. silver certificates and 868,700,000 ounces which remained unpledged. . . . England's industrial consumption of silver, restricted entirely to war purposes, is estimated at 14,000,000 to 18,000,000 ounces. Canadian arts and industries absorbed an estimated 5,000,000 ounces, a new high record. An estimate for the arts and industries in the United States in 1944 is 125,000,000 ounces; of this, 65 per cent was for war and other essential purposes. Among war purposes in the United States, solders and brazing alloys moved into first place, followed in order of quantity by photographic products and processes, electrical parts, airplane engine bearings and military insignia. There was a marked growth in the employment of silver for electrical purposes, including Radar and a continued heavy rate of use in aircraft engine bearings. . . ."

On January 2, 1945, the London silver market commenced to quote bar silver in pence per troy ounce 0.999 fine instead of in pence per ounce standard, that is, per ounce troy 0.925 fine.

Increase in Silver Price in United States 1945

(E & M J Metal & Mineral Markets, New York)

"The office of United States Price Administration raised the ceiling price of foreign silver in September, 1945, from 45 cents a fine ounce to 71.111 cents. The higher level became effective on September 21, 1945. In taking this action OPA established a uniform maximum price for both foreign and domestic silver.

"Foreign silver is defined by the pricing organization as 'all silver other than newly mined domestic silver or silver sold by the United States Treasury under the Green Act'. The measure, sponsored by Senator Green, which became law in 1943, permitted the sale of Treasury silver for war purposes and other uses at a price equivalent to the domestic price of 71.111 cents.

"Use of foreign silver had been restricted under the war program to essential war needs. Consumers of silver who could not qualify to obtain the lower-priced foreign metal, such as manufacturers of silverware and jewellery, had to purchase the higher-priced domestic or Treasury silver.

"WPB Order M-199, which limited and controlled the uses of silver, was revoked August 20, 1945, and continuance of different maximum prices for foreign and domestic silver after that date was no longer practicable, OPA said. Foreign consumers were paying higher prices than 45 cents for silver and the flow of foreign metal into the United States market threatened to decline appreciably. . . ."

Table 107.—Production of Silver From All Ores in Canada for Years Specified, 1887-1944

Year	Ounces	Cents per ounce	Year	Ounces	Cents per ounce
1887.....	355,083	98-00	1931.....	20,562,247	29.87
1891.....	414,523	98-00	1932.....	18,347,907	31.67
1896.....	3,205,343	67-06	1933.....	15,187,950	37.83
1901.....	5,539,192	58-95	1934.....	16,415,282	47.46
1906.....	8,473,379	66-79	1935.....	16,618,558	64.79
1910 (*).....	32,869,264	53-49	1936.....	18,334,487	45.13
1911.....	32,559,044	53-30	1937.....	22,977,751	44.88
1916.....	25,459,741	65-66	1938.....	22,219,195	43.48
1919.....	16,020,657 (†)	111-122	1939.....	23,163,629	40.49
1920.....	13,330,357	100-90	1940.....	23,833,752	38.25
1925.....	20,228,988	69-06	1941.....	21,754,408	38.26
1927.....	22,736,698	56-37	1942.....	20,095,101	42.17
1929.....	23,143,261	52-99	1943.....	17,344,569	45.25
1930.....	26,443,823	38-15	1944.....	13,627,109	43.0

(*) Year of maximum output.

(†) Highest price per ounce recorded since 1887.

Refined silver produced in Canada during 1944 totalled 12,021,146 fine troy ounces compared with 15,900,840 fine troy ounces in 1943.

Canadian refined silver is sold in Canada (September 1945) to the Canadian consumer at 40 cents per ounce. Silver, in all forms (bullion, ores, etc.), is under export permit designed to see that the Canadian consumer is protected as to his supply, after which all excess can be exported to foreign markets. Silver in ores exported to the United States is paid for by the U.S. smelter in the usual way. Export permit forms can be obtained from Canadian customs offices.

Table 108.—Production of Silver in Canada, by Provinces and Method of Computation, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
NOVA SCOTIA—				
In gold bullion.....	144	65	188	81
QUEBEC—				
In anode copper.....	1,509,610	683,159	1,255,790	539,990
In gold bullion made and in concentrates exported.....	702,505	317,912	1,244,891	535,303
Total.....	2,212,115	1,001,071	2,500,681	1,075,293
ONTARIO—				
In silver recovered in Canada from cobalt ores.....	97,411	44,082	684,092	294,160
In gold bullion.....	339,640	153,701	278,413	119,717
In blister copper.....	1,608,787	728,040	1,812,447	779,352
In ores, concentrates, residues, matte, etc., exported.....	625,482	283,056	368,323	158,379
Total.....	2,671,320	1,208,879	3,143,275	1,351,608
MANITOBA—				
In blister copper.....	533,906	241,614	519,707	223,474
In gold bullion (gold mines) and ores exported.....	53,373	24,153	50,166	21,571
Total.....	587,279	265,767	569,873	245,045
SASKATCHEWAN—				
In blister copper.....	2,812,623	1,272,825	1,735,773	746,382
In gold bullion and in crude alluvial gold.....	1			
Total.....	2,812,624	1,272,825	1,735,773	746,382
ALBERTA—				
In alluvial gold.....	1		4	2
BRITISH COLUMBIA—				
In alluvial gold.....	2,628	1,189	2,000	860
In gold bullion.....	30,431	13,771	17,725	7,622
In base bullion and in ores, etc., exported.....	8,962,429	4,055,858	5,611,847	2,413,094
Total.....	8,995,488	4,070,818	5,631,572	2,421,576
YUKON—				
In alluvial gold.....	8,810	3,987	5,124	2,203
In silver-lead ores exported.....	43,538	19,703	26,942	11,585
Total.....	52,348	23,690	32,066	13,788
NORTHWEST TERRITORIES—				
In pitchblende-silver ores shipped to smelters (*) and in gold bullion.....	13,250	5,996	13,677	5,881
Canada—Total.....	17,344,569	7,849,111	13,627,109	5,859,656

(*) Complete data relating to recovery of silver from pitchblende ores are not available since 1942.

NOTE.—For 1944, silver was valued at 43 cents per fine ounce, the average price of domestic sales and sales on the New York market adjusted and expressed in Canadian funds; for 1943, the corresponding price was 45-254 cents.

Table 109.—Source of Canadian Silver Production, by Percentages, 1939-1944

Source	1939	1940	1941	1942	1943	1944
In silver-cobalt ores.....	6.5	5.38	2.6	4.13	0.81	5.05
In base bullion (a).....	(b) 39.7	(b) 44.39	45.3	46.16	45.58	35.52
In gold ores (bullion and placer).....	4.6	3.60	4.1	3.71	3.07	3.21
In blister and anode copper (c).....	23.6	27.62	31.8	34.28	37.28	39.07
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores).....	25.6	19.01	16.2	11.72	13.26	17.15
	100.0	100.0	100.0	100.0	100.0	100.0

(a) Chiefly from silver-lead ores.

(b) Includes silver recovered in Canada from pitchblende-silver ores.

(c) Made from copper-gold-silver and nickel-copper ores.

Table 110.—Canadian Silver Production According to Nature of Ores,
by Provinces, 1944

Province	Crude placer gold	Auriferous quartz ores	Copper- gold- silver ores	Nickel- copper ores	Silver- lead- zinc ores	Silver- cobalt and other ores	Total
	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Nova Scotia.....		188					188
Quebec.....		126,958	1,272,181		1,101,542		2,500,681
Ontario.....		577,516		1,828,978	48,526	(*) 688,255	3,143,275
Manitoba.....		6,307	563,566				569,873
Saskatchewan.....			1,735,773				1,735,773
Alberta.....	4						4
British Columbia.....	2,000	140,624	223,154		(†) 5,265,794		5,631,572
Northwest Territories.....		5,428				8,249	13,677
Yukon.....	5,124				26,942		32,066
Canada.....	7,128	857,021	3,794,674	1,828,978	6,442,804	696,504	13,627,109

(*) Exclusive of silver in cobalt-silver ores placed on United States Government stock pile at Deloro, Ontario, but includes any silver in ores reshipped from this stock pile.

(†) Contains a relatively small quantity recovered from gold ores.

Table 111.—Imports Into Canada and Exports of Silver and Films, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	oz.	\$	oz.	\$
IMPORTS—				
Silver, unmanufactured.....				
Silver, manufactures of, n.o.p.....		31,427		36,296
Toilet articles of which the most important component, in value, is sterling silver.....		254		53
Total.....		31,681		36,349
EXPORTS—				
Silver contained in ore, concentrates, etc.....	2,253,018	1,040,297	2,389,739	1,170,475
Silver bullion (Canadian).....	9,198,617	4,517,756	3,577,243	1,762,944
Silver manufactures.....		71,300		208,367
Total.....		5,629,353		3,141,806
IMPORTS OF PHOTOGRAPH FILM—				
Photographers.....		407,054		610,890
Cinematograph (positives).....	(ft.) 4,565,195	368,470	7,016,432	563,674
Films for aerial photography.....		65,442		89,342
Cinematograph (negatives).....		76,880		75,763
Educational.....		338,313		277,289
X-Ray film.....		(*)		451,778
EXPORTS—				
Film for photographers' use and for moving pictures.....		803,267		1,559,626

(*) Not shown separately.

Table 112.—Silver Consumed in Specified Canadian Industries, 1943 and 1944

	1943		1944	
	Fine oz.	Value	Fine oz.	Value
		\$		\$
Electrical apparatus.....	15,815	8,538	11,112	5,646
Scientific equipment (*).....	702,882	279,885	742,774	298,765
Fountain pens and pencils.....	54,712	25,497	11,668	5,239
Jewellery and silverware (fine silver).....		1,421,450		1,749,154
Jewellery and silverware (silver alloys).....		837,907		1,014,775
Medicinal and pharmaceutical preparations (bullion).....	147,254	61,038	130,061	54,063
White metal alloys.....	400,736	163,230	256,237	104,125

(*) Consumed largely in the manufacture of photographic film.

Table 113.—Silver Production of the World (American Bureau of Metal Statistics)—
Fine troy ounces

	1938	1944
NORTH AMERICA—		
United States (inc. Philippine Islands).....	58,736,000	37,370,000
Canada.....	22,219,195	13,545,905
Mexico.....	81,016,939	63,000,000
Newfoundland.....	1,645,590	1,163,000
Total North America.....	163,617,724	115,078,905
CENTRAL AMERICA AND WEST INDIES.....	4,300,000	4,000,000
SOUTH AMERICA—		
Argentina.....	3,755,000	1,695,000
Bolivia.....	6,373,660	6,797,378
Chile.....	1,375,498	950,000
Colombia.....	192,872	205,000
Ecuador.....	89,111	325,000
Peru.....	20,552,177	11,650,000
Other South America.....	47,000 (*)	100,000
Total South America.....	32,385,318	21,722,378
EUROPE—		
Czechoslovakia.....	1,190,326	
France.....	(*) 565,000	
Great Britain.....	107,985	
Germany.....	(*) 7,000,000	
Greece.....	150,000	
Italy.....	812,500	
Norway.....	235,338	
Poland.....	62,244	
Romania.....	819,864	
Russia.....	(*) 7,000,000	
Spain.....	237,653	
Sweden.....	1,123,835	
Yugoslavia.....	2,524,074	
Other Europe.....	140,000	
Total Europe.....	21,968,819	(†)
OCEANIA—		
New South Wales.....	9,558,550	
Queensland.....	3,533,490	
Tasmania.....	1,219,550	
Western Australia.....	271,346	103,000
New Guinea.....	141,760	
New Zealand.....	357,709	
Other Oceania.....	20,000	
Total Oceania.....	15,102,405	(†)
ASIA—		
India and Burma.....	6,450,000	
China.....	(*) 150,000	
Korea.....	(*) 3,000,000	
Netherlands Indies.....	579,131	
Cyprus.....	106,522	
Japan.....	(*) 10,000,000	
Turkey.....	350,000	
Other Asia.....	140,000	
Total Asia.....	20,775,653	(†)

**Table 113.—Silver Production of the World (American Bureau of Metal Statistics)
—Fine troy ounces—Concluded**

	1938	1944
AFRICA—		
Algeria.....	90,000	
Nigeria.....	(*) 50,000	
Rhodesia.....	254,654	103,800
Transvaal, Cape Colony and Natal.....	1,135,374	
Belgian Congo.....	3,122,215	
French Morocco.....	208,980	
Southwest Africa.....	636,396	
Tunis.....	61,149	
Other Africa.....	60,000	
Total Africa.....	5,618,768	(†)
Total for world.....	263,768,687	(†)

(*) Conjectural.

(†) Data not available.

**Table 114.—World's Monetary Stocks of Silver at the Close of 1943 (Supplied by the
United States Mint and Subject to Revision) Stated in United States
money, 000's omitted**

Country	Monetary unit	Silver stocks in banks and treasuries	Per capita
		\$	\$
NORTH AMERICA—			
United States (including Alaska, Hawaii and Puerto Rico).....	dollar	3,287,817	24.43
Canada.....	dollar	40,010	3.50
Mexico.....	Peso	(1)	(1)
Newfoundland and Labrador (2).....	dollar	2,281	7.60
CENTRAL AMERICA AND WEST INDIES—			
British Honduras.....	dollar	196	3.21
BRITISH WEST INDIES—			
Barbados.....	dollar	1,560	7.88
Jamaica.....	pound	838	0.68
Trinidad and Tobago (3).....	dollar	1,200	2.37
Costa Rica.....	colon	128	0.19
Cuba (4).....	peso	88,000	20.95
Dominican Republic (4).....	dollar	489	0.28
Guatemala.....	quetzal	1,707	0.50
Haiti (5).....	Gourde	(1)	(1)
Honduras.....	Lempira	4,450	3.85
Nicaragua.....	cordoba	103	0.07
Panama, Republic of (6).....	balboa	1,010	1.60
Salvador (6).....	colon		
SOUTH AMERICA—			
Argentina.....	peso		
Bolivia.....	Bolivian	3,873	1.12
Brazil.....	cruzeiro	(1)	(1)
British Guiana (3).....	dollar	1,188	3.42
Chile.....	peso	9,503	1.01
Colombia.....	peso	438	0.15
Ecuador.....	sucre		
Paraguay.....	peso		
Peru.....	sol	3,538	0.50
Surinam.....	florin	526	2.81
Uruguay.....	peso	6,403	2.91
Venezuela.....	bolivar	(1)	(1)
EUROPE—(1).....		(1)	(1)
ASIA—			
British India (excluding Burma) (7).....	rupee	37,050	0.10
Iran.....	rial	20,204	1.68
Palestine and Trans-Jordan.....	pound	6,698	4.23
AFRICA—			
British East Africa (Kenya, Tanganyika, Uganda and Zanzibar).....	shilling	17,578	1.37
British West Africa (Gambia, Gold Coast, Nigeria and Sierra Leone).....	pound	386	0.01
Egypt and Anglo Egyptian Soudan.....	pound	22,875	0.99
Portuguese East Africa (8).....	escudo	240	0.06
Southwest Africa.....	pound	79	0.22
OCEANIA—			
Fiji Islands.....	pound	657	3.06
New Zealand.....	pound	7,168	4.39

(1) Data not available.

(2) Canadian coin and currency also circulate.

(3) Estimated.

(4) Dominican Republic—Silver: Dominican and United States; Paper: United States.

(5) United States coin and currency also circulate.

(6) Silver was demonetized under decree of December 23, 1941 effective February 28, 1942.

(7) Source: The Statist, January 30, 1943. Silver represents rupee coin in Reserve Bank of India.

(8) Silver escudos converted at rate of 15 per dollar (\$0.0666+).

LEAD AND ZINC

Statistics relating to Canadian primary production of lead and zinc represent the content of these metals contained in ores exported plus the quantity of lead in base bullion produced and refined zinc made in Canada. Refined lead is produced in Canada only by the Consolidated Mining & Smelting Company of Canada Ltd. which company operates an electrolytic lead refinery at Trail, British Columbia. Refined zinc is produced at Flin Flon, Manitoba by the Hudson Bay Mining and Smelting Company Limited and at Trail, British Columbia by the Consolidated Mining and Smelting Company of Canada Ltd.

The following information is from reports on lead and zinc as prepared by the Bureau of Mines, Ottawa:

"Lead production in Canada is obtained from the various silver-lead-zinc mines of British Columbia and to a smaller extent from the few zinc-lead mines in Quebec and Ontario. The Sullivan mine at Kimberley, British Columbia, operated by Consolidated Mining and Smelting Company of Canada, is the principal source of production. Canada exports the greater part of its output of lead.

"Lead is used chiefly in the lead pigment, cable covering, storage battery, building, and ammunitions industries, and in the manufacture of tetraethyl lead for gasoline. So far in the present war it has been the least scarce of the metals, but, as a result of direct and indirect war demands and the substitution of lead for copper and brass, consumption has been increasing. There are many purposes for which lead is normally used to a greater or lesser extent in competition with other materials now critical; for example, lead in plumbing, for sheet metal work on buildings, as bearing metal to replace tin, and as chemical tank linings and pipes.

"Tetraethyl lead, which has become an important outlet for lead, plays an indispensable role in the production of aviation gasoline. Much interest has been shown in combinations of lead with iron, particularly leaded steel. A lead coating is being used as a lubricant for successive wire-drawing operations on alloy steel, the coating being removed finally with the use of solvents. Lead-base bearings are still used extensively in low-speed applications.

"The average price of pig lead (quotations on the London market, converted to Canadian funds) was 4.5 cents a pound throughout 1944. The price at New York was 6.50 cents throughout 1944.

"Close to 55 per cent of the zinc produced in Canada in 1944 came from Consolidated Mining and Smelting Company's Sullivan silver-lead-zinc mine near Kimberley, British Columbia. The remainder was from Hudson Bay Mining and Smelting Company's copper-zinc deposits at Flin Flon, which straddle the Manitoba-Saskatchewan boundary; the Sherritt-Gordon copper-zinc mine in northern Manitoba; several small lead-zinc properties in West Kootenay district, British Columbia; the Lake Geneva lead-zinc property, Sudbury district; the Normetal and Waite-Amulet copper-zinc mines in western Quebec; and the Tetreault and New Calumet lead-zinc mines in Quebec. About 77 per cent of the Canadian production of zinc in 1944 was exported, mostly in the refined form.

"Zincton Mines, Limited operated the Lucky Jim zinc mine and its 350-ton concentrator at Zincton, B.C., at a reduced rate.

"Golden Manitou Mines, Limited operated its mine and 1,000-ton concentrator near Val d'Or, Quebec. Its contract with the United States Government agencies for zinc concentrates expired January 1, 1945, but it made a new contract with American Zinc Company of Illinois for a period of 3 years. The company reports ore reserves above the 960-foot level of 983,100 tons averaging 7.74 per cent zinc, 0.045 ounce of gold, and 3.06 ounces of silver. Ore of good grade not included in the above estimate has been proved by diamond drilling down to a depth of 1,500 feet.

"Hollinger North Shore Exploration Company (Hollinger Consolidated Gold Mines) investigated occurrences of zinc that were disclosed in 1943 on its concession near the Quebec-Labrador boundary. Limited exploratory work on an outcrop indicated a width of 13 feet of zinc ore and a length, determined by trenching, of 660 feet, the grade being 6.75 per cent

zinc, 1.32 per cent copper, and \$2.00 in precious metals. Prior to the war, United States, Canada, Australia, Germany, Poland, Mexico, and Russia, in the order named, were the principal producers of zinc from ores of domestic origin.

"The basic uses of zinc under war conditions are the same as those in peacetime, but in all fields of use the wartime demand for the metal is exceptionally large. In peacetime, the galvanizing industry uses most of the primary and secondary output of zinc. Large quantities of the metal are used also in the brass and castings industry; as paint pigments; in radio and flashlight batteries; and in the making of zinc oxides. A large percentage of the Canadian consumption of zinc is used in the war effort in the making of brass and bronze products, for galvanizing, for die casting, in zinc oxide, in dry batteries; and for miscellaneous purposes.

"The average price of zinc in 1944, in Canadian funds (based on London quotations), was 4.3 cents per pound, compared with 4.0 cents in 1943. The St. Louis price was 8.25 cents throughout 1944. This price has prevailed since 1942."

The Canadian prices for both lead and zinc are controlled by Wartime Prices and Trade Board (October, 1945). Permit forms for the export of non-ferrous ores can be obtained from customs offices.

The Mining Journal, London, in its annual review for 1944, stated: "It is not possible to present with any accuracy statistics of world production and consumption of lead and zinc in 1944. So far as the United Nations are concerned they have ample supplies of these metals to meet all their wartime requirements and the prospect at the end of the year was that, though stocks of zinc were tending to increase still further, stocks of lead were declining rapidly. Prices of lead in both Britain and the United States remain unchanged, British prices being £25 per long ton and the United States (New York) price 6.5 cents per pound. There was no change in zinc prices during the year. In Britain, foreign zinc, duty paid, continued to be controlled at £25.15s. per ton and electrolytic zinc at £27.5s. per ton. In the United States the price of prime western zinc was 8.25 cents per pound."

The agreement made in 1939 by the large Canadian base metal producers and the Imperial Government, by which the producers were to supply the Imperial Government with copper, lead and zinc at prices which prevailed shortly before the outbreak of the war, was continued in 1944 with some adjustments or revisions for increases in prices due to the increased cost of labour and materials. Canada can now furnish large quantities of these metals in the refined state, whereas in 1914 no refined copper, nickel or zinc and only a comparatively small amount of refined lead were produced in this country.

Table 115.—Production (b) of New Lead in Canada, 1935-1944

Year	Pounds	\$	Average Price per pound (Canadian funds) cents
1935.....	339,105,079	10,624,772	3.133
1936.....	383,180,909	14,993,869	3.913
1937.....	411,999,484	21,053,173	5.110
1938.....	418,927,660	14,008,941	3.344
1939.....	388,569,550	12,313,768	3.169
1940.....	471,850,256	15,863,605	3.362
1941.....	460,167,005	15,470,815	3.362
1942 (a).....	512,142,562	17,218,233	3.362
1943.....	444,060,769	16,670,041	3.754
1944.....	304,582,198	13,706,199	4.500

NOTE.—Year of maximum value of Canadian lead production; \$23,127,460 in 1925.

(a) Year of maximum output of Canadian lead.

(b) Primary lead in base bullion produced plus lead in ores exported.

RESTRICTIONS ON THE PURCHASE OF LEAD IN CANADA

(Department of Munitions and Supply)

In order to conserve the supplies of lead, Order M.C. 11 was put into force on May 2, 1942. This order prohibited any person acquiring virgin lead from a primary smelter. In June of the same year this order was amended to include certain lead and lead alloys and effective October 1, 1943, consumers' inventories of lead were limited to sixty days' requirements. On June 23, 1945, a new order M.C. 11E allowed the purchase of up to 2000 pounds of lead per month without permission from the Metals Controller, but restricted inventories to two months' requirements or 2000 pounds whichever was greater.

Although lead is still under allocation by the Combined Raw Materials Board, the Canadian lead situation was so favorable that on August 27, 1945, Order No. M.C. 11E was rescinded and all restrictions on the purchase of lead in Canada were removed.

Table 116.—Production in Canada, Imports and Exports of Lead, 1943 and 1944

	1943		1944	
	Pounds	Value	Pounds	Value
		\$		\$
PRODUCTION—				
Quebec.....	2,435,523	91,430	10,487,842	471,953
Ontario.....	2,273,896	85,362	1,065,741	47,958
British Columbia.....	439,155,635	16,485,902	292,922,888	13,181,530
Yukon.....	195,715	7,347	105,727	4,758
Total.....	444,060,769	16,670,041	304,582,198	13,706,199
IMPORTS—				
Pig and block.....	19,481	3,561	20,225	2,868
Old and scrap.....	2,183	87	6,096	282
Bars and sheets.....	8,862	1,379	10,156	1,504
Litharge for storage batteries.....	2,397,300	203,677	3,155,100	266,530
Acetate of lead.....	62,307	8,013	131,876	16,998
Nitrate of lead.....	123,163	15,453	303,265	36,658
Other manufactures.....		229,644		382,455
Pipe lead.....	59	10	2,533	528
Shots and bullets.....	141,484	22,176	15,721	2,479
Lead arsenate.....	4,432	484		
Lead tetraethyl, compounds of.....	10,556,057	3,568,496	10,033,373	3,378,702
Lead capsules for bottles.....		25,465		16,019
Lead pigments—				
Dry white lead.....	435,835	37,606	336,000	29,890
White lead, ground in oil.....			180	23
Dry red lead and orange mineral.....	114,123	11,936	400,392	39,175
Total.....		4,127,987		4,174,111
EXPORTS—				
Lead, contained in ore.....	11,470,200	425,306	19,000,300	650,433
Pig lead.....	308,695,300	9,222,104	205,759,600	6,394,550
White lead.....	205,500	20,380	373,000	39,734
Total.....		9,667,790		7,084,717

Production of lead in all forms and from all types of Canadian ores from 1887 to 1944 inclusive, totalled 8,566,923,587 pounds valued at \$368,433,325.

The annual capacity for the production of refined lead at Trail, British Columbia, is approximately 244,000 short tons.

Table 117.—Refined Lead Production in Canada(*) 1929-1944

Year	Pounds of refined lead produced	Year	Pounds of refined lead produced
1929.....	304,449,673	1937.....	(†) 399,394,939
1930.....	304,471,706	1938.....	(†) 400,763,914
1931.....	278,448,457	1939.....	(†) 381,137,424
1932.....	253,136,522	1940.....	(†) 440,175,333
1933.....	254,565,861	1941.....	(†) 456,054,164
1934.....	(†) 314,457,735	1942.....	(†) 486,612,849
1935.....	(†) 327,515,277	1943.....	(†) 447,742,463
1936.....	(†) 363,449,490	1944.....	(†) 285,162,139

(*) Includes the electrolytic lead produced from Canadian and foreign ores at Trail, B.C., and also the pig lead from Galetta, Ont., until 1931.

(†) Primary lead only.

Table 118.—Available Statistics on the Consumption of Lead in Specified Canadian Manufacturing Industries, 1942 and 1944

Industry	Items used	1942	1943	1944
		Pounds	Pounds	Pounds
Brass and copper products.....	Pig lead.....	1,780,402	1,689,325	2,187,292
	Scrap and other lead....	641,465	400,780	1,375,903
White metal alloys.....	Pig lead.....	48,281,959	51,823,690	52,700,766
	Scrap lead.....	21,194,878	22,714,238	28,674,358
Electrical apparatus.....	Pig lead (pure and antimonial).....	39,690,349	42,655,554	44,399,623
	Scrap lead.....	127,733	77,422	203,459
Iron and steel.....	Lead.....	6,050,628	4,281,005	3,327,184
Ammunition.....	Pig lead.....	10,467,968	6,883,360	4,425,391
Total accounted for.....		128,235,382	130,525,354	137,293,976

Table 119.—Lead Production of the World on Mine Basis, 1938 and 1944 (American Bureau of Metal Statistics)

(Tons of 2,000 pounds)

	1938	1944
United States.....	369,726	410,750
Canada.....	209,457	150,537
Newfoundland.....	31,856	30,000
Mexico.....	311,255	197,437
Total North America.....	922,294	788,724
Argentina.....	26,125	21,000
Bolivia.....	14,578	9,973
Chile.....	1,016	
Peru.....	63,982	53,000
Total South America.....	105,701	83,973
Austria.....	(a)	
Bulgaria.....	375	
Czechoslovakia.....	4,409	
Finland.....	95	
France.....	5,511	
Germany.....	105,821	
Great Britain.....	33,312	
Greece.....	4,519	
Italy.....	43,541	
Norway.....	161	
Poland.....	5,842	
Romania.....	6,233	
Russia.....	76,000	
Spain.....	35,063	30,000
Sweden.....	9,502	
Yugoslavia.....	85,649	
Total Europe.....	416,033	(c)
Burma.....	89,712	
China, including Hong Kong.....	7,716	
Japan.....	13,000	
Korea.....	11,000	
Turkey.....	6,173	
Total Asia.....	127,601	(c)
Australia.....	307,293	197,303
Algeria.....	5,071	
French Morocco.....	20,944	
Nigeria.....	332	
Southwest Africa.....	19,302	
Tunis.....	20,833	
Other Africa.....	7,709	
Total Africa.....	74,182	(c)
Grand Total.....	1,953,104	(c)

(a) Included with Germany.

(b) Conjectural.

(c) Data not available.

Small productions from Brazil, Ecuador and the Philippines are not included in the above table.

ZINC

Table 120.—Production (b) of Zinc From All Types of Canadian Ores, 1935-1944

Year	Pounds	\$	Average price per pound Canadian funds
			c.
1935.....	320,649,859	9,936,908	3·10
1936.....	333,182,736	11,045,007	3·31
1937.....	370,337,589	18,153,949	4·90
1938.....	381,506,588	11,723,698	3·07
1939.....	394,533,860	12,108,244	3·07
1940.....	424,028,862	14,463,624	3·411
1941.....	512,381,636	17,477,337	3·411
1942.....	580,257,373	19,792,579	3·411
1943 (a).....	610,754,354	24,430,174	4·00
1944.....	550,823,353	23,685,405	4·30

(a) Year of maximum Canadian zinc production.

(b) Comprises refined zinc made in Canada plus zinc in ores, etc., exported.

The total value of Canadian zinc production since the first recording of Canadian zinc statistics in 1898, and inclusive of 1944, totalled \$280,533,781.

Table 121.—Production in Canada, Imports and Exports of Zinc, 1943 and 1944

	1943		1944	
	Pounds	Value	Pounds	Value
		\$		\$
PRODUCTION—				
Quebec.....	128,169,810	5,126,792	137,378,439	5,907,273
Ontario.....	3,299,812	131,993	2,429,176	104,455
Manitoba.....	46,783,873	1,871,855	45,822,278	1,970,358
Saskatchewan.....	96,350,404	3,854,016	87,130,087	3,746,594
British Columbia.....	336,150,455	13,446,018	278,063,373	11,956,725
Total.....	610,754,354	24,430,174	550,823,353	23,685,405
IMPORTS—				
Zinc dust.....	7,500	1,014	40,200	4,089
Zinc in blocks, pigs, bars and rods, and zinc plates, n.o.p.....	138,400	26,257	156,900	26,722
Zinc in sheet and strips, and zinc plates for marine boilers.....	987,300	141,997	991,600	153,954
Zinc spelter.....	27,076,400	2,429,945	8,883,000	794,865
Zinc slugs for dry batteries.....		64,385		86
Zinc white (zinc oxide).....	2,218,564	174,075	1,745,535	137,612
Zinc sulphate.....	708,869	31,743	986,136	41,278
Zinc, chloride of.....	189,305	11,745	192,935	11,928
Zinc, manufactures of, n.o.p.....		377,486		351,218
Lithopone.....	17,754,879	857,507	18,999,905	932,787
Total.....		4,116,154		2,454,539
EXPORTS—				
Zinc, manufactures of (from Jan. 1, 1944).....				193,519
Zinc, contained in ore.....	222,550,300	6,097,117	226,606,900	7,046,844
Zinc, scrap, dross and ashes.....	4,291,000	159,218	9,144,200	301,941
Zinc, spelter.....	258,629,700	10,260,030	191,970,000	7,666,731
Total.....	485,471,000	16,516,365	427,721,100	15,209,035

Canadian zinc refineries have an estimated annual capacity of 237,500 tons of cathode zinc.

Table 122.—Canadian Zinc Production (Recoverable) According to Nature of Ores, by Provinces, 1939-1944

Year and Province	Recovered from copper-gold-silver ores	Recovered from silver-lead-zinc and other ores	Total
	Pounds	Pounds	Pounds
1939—Nova Scotia.....		9,152,856	9,152,856
Quebec.....	28,758,759		28,758,759
Manitoba.....	40,302,747		40,302,747
Saskatchewan.....	37,278,001		37,278,001
British Columbia.....		279,041,497	279,041,497
Total Canada.....	106,339,507	288,194,353	394,533,860
1940—Nova Scotia.....		4,755,502	4,755,502
Quebec.....	27,696,721		27,696,721
Manitoba.....	35,103,373		35,103,373
Saskatchewan.....	44,452,595		44,452,595
British Columbia.....		312,020,671	312,020,671
Total Canada.....	107,252,689	316,776,173	424,028,862
1941—Quebec.....	46,389,581		46,389,581
Ontario.....		1,100,949	1,100,949
Manitoba.....	34,879,239		34,879,239
Saskatchewan.....	62,142,288		62,142,288
British Columbia.....		367,869,579	367,869,579
Total Canada.....	143,411,108	368,970,528	512,381,636
1942—Quebec.....	67,064,536	6,876,275	73,940,811
Ontario.....		4,710,394	4,710,394
Manitoba.....	29,908,179		29,908,179
Saskatchewan.....	84,461,520		84,461,520
British Columbia.....		387,236,469	387,236,469
Total Canada.....	181,434,235	398,823,138	580,257,373
1943—Quebec.....	80,401,837	47,767,973	128,169,810
Ontario.....		3,299,812	3,299,812
Manitoba.....	46,783,873		46,783,873
Saskatchewan.....	96,350,404		96,350,404
British Columbia.....	461,776	335,688,679	336,150,455
Total Canada.....	223,997,890	386,756,464	610,754,354
1944—Quebec.....	78,069,636	59,308,803	137,378,439
Ontario.....		2,429,176	2,429,176
Manitoba.....	45,822,278		45,822,278
Saskatchewan.....	87,130,087		87,130,087
British Columbia.....	1,953,077	276,110,296	278,063,373
Total Canada.....	212,975,078	337,848,275	550,823,353

RESTRICTIONS ON THE PURCHASE OF ZINC IN CANADA

(Department of Munitions and Supply)

Due to a shortage of zinc for the production of munitions for war, it became necessary to restrict the use of zinc to essential purposes. Accordingly, on May 11, 1942, an Order (M.C. 12) was issued which prohibited any person from buying or selling zinc without a permit from the Metals Controller.

As the war continued and munitions orders increased, amendments were made to Order M.C. 12 to include Zinc Oxide and Zinc Mill Products. Not until after the cessation of the war in Europe was it possible to lift these restrictions in any way, but on June 7, 1945, the control of Zinc Oxide and Zinc Dust was removed by Order M.C. 12E, and only an inventory control was retained on slab zinc.

In August, 1945, immediately following the termination of the war with Japan, Order No. M.C. 12E was rescinded and restrictions on the purchase of zinc were removed.

Table 123.—Refined New Zinc Produced in Canada, 1933-1944

Year	Average price (*) per pound	Short tons	Year	Average price (x) per pound	Short tons
	cents			cents	
1933.....	3-21	91,946	1939.....	3-07	175,641
1934.....	3-04	134,917	1940.....	3-411	185,722
1935.....	3-10	149,523	1941.....	3-411	213,608
1936.....	3-31	151,103	1942.....	3-411	215,795
1937.....	4-90	158,542	1943.....	4-00	206,510
1938.....	3-07	171,932	1944.....	4-30	168,518

(*) In Canadian funds.

Table 124.—Available Statistics on the Consumption of Zinc in Specified Canadian Manufacturing Industries, 1942, 1943 and 1944

Industry	Items Used	1942	1943	1944
		Pounds	Pounds	Pounds
Brass and copper products.....	Zinc ingots and slabs.....	76,990,715	84,315,181	56,378,930
	Zinc scrap.....	525,767	119,050	216,857
White metal alloys.....	Zinc spelter.....	26,581,960	17,795,100	10,457,447
	Zinc scrap.....	1,746,106	3,223,818	2,237,019
Electrical apparatus.....	Zinc ingots and bars.....	2,826,831	3,227,960	3,493,108
	Zinc sheets.....	1,477,013	1,627,460	2,324,543
Acids, alkalies and salts.....	Zinc metal.....	16,033,434	20,689,824	21,919,325
Iron and steel.....	Zinc.....	45,378,520	35,855,555	43,284,193
Ammunition.....	Zinc spelter.....	342,000	1,834,000	2,956,000
Grant Total.....		171,902,346	168,687,948	143,267,422

In addition, there are relatively large quantities of zinc oxide and lithopone used in the manufacture of paint.

Table 125.—World's Production of Zinc Spelter (a) 1938 and 1944 (American Bureau of Metal Statistics)
(Tons of 2,000 pounds)

Country	1938	1944
United States (b).....	446,341	866,100
United States (c).....	31,613	48,600
Mexico.....	39,552	51,401
Canada.....	171,656	169,634
Total North America.....	689,162	1,135,735
Belgium.....	231,924	
Czechoslovakia.....	9,784	
France.....	68,532	
Germany.....	212,173	
Great Britain.....	61,938	
Italy.....	37,550	
Netherlands.....	27,888	
Norway.....	51,257	
Poland.....	122,119	
Russia.....	(d) 88,200	
Spain.....	8,435	19,313
Yugoslavia.....	4,361	
Total Europe.....	924,161	(e)
Peru.....		1,611
Australia.....	78,198	88,458
Japan.....	(d) 55,115	
French Indo-China.....	4,900	
Rhodesia.....	11,441	
Grand Total.....	1,762,977	(e)

(a) The statistics in this table are the summaries of production as made by the metallurgical works in the several countries. The statistics for the United States are given separately in respect of the production from ore (domestic and foreign) and the production from secondary material, such as galvanizers' dross, skimmings, ashes, etc. Production from such material is included in the statistics for many of the countries of Europe, especially Great Britain, Belgium, France and Netherlands. Such inclusion in 1938 was about 40,000 tons per annum, omitting Great Britain. Not included in the statistics for Europe is the production from old material by concerns that treat nothing else.

(b) Production from ores, foreign and domestic, as per U.S. Bureau of Mines.

(c) Production from secondary material.

(d) Conjectural.

(e) Not available.

Table 126.—Cadmium Recovered From Canadian Ores, 1938-1944

Year	From copper-gold-silver-zinc ores	From silver-lead-zinc-ores	Total
	Pounds	Pounds	Pounds
1938.....	188,796	510,342	699,138
1939.....	140,438	799,253	939,691
1940.....	129,336	778,791	908,127
1941.....	169,917	1,081,374	1,251,291
1942.....	176,550	972,413	1,148,963
1943.....	187,938	598,673	786,611
1944.....	140,560	386,410	526,970

Since 1939 the Consolidated Mining and Smelting Company has produced antimony metal at the Trail smelter; the total production of the metal from British Columbia ores in 1944 totalled 1,937,933 pounds valued at \$281,000. Bismuth metal is also recovered at the Trail smelter from silver-lead-zinc ores, the production in 1944 amounting to 123,875 pounds valued at \$154,844. In addition to metals, there has been an increasing quantity of sulphur salvaged yearly in the smelting of silver-lead-zinc ores in the Trail plants of the Consolidated Mining and Smelting Company. This has been recovered in both the gaseous and elemental forms and is utilized in the manufacture of sulphuric acid and fertilizers.

Gold recovered from Canadian silver-lead-zinc ores in 1944 totalled 17,438 fine ounces.

CHAPTER FOUR

THE NICKEL-COPPER INDUSTRY IN CANADA

1. Definition of the Industry.
2. General Review.
3. Commodity statistics, including tables showing production, prices, etc., for nickel, copper and metals of the platinum group.

1. Definition of the Industry

The nickel-copper industry in Canada includes the mining, smelting and, to a certain extent, the refining of the nickel-copper ores of the Sudbury district in the province of Ontario. Smelting and copper refining operations are carried on in close proximity to the mines; nickel refining is conducted at Port Colborne, Ontario. Matte is exported for treatment in plants at Huntington, West Virginia, U.S.A., and Clydach, Wales; during recent years matte was also exported to Norway, however, exports to that country ceased after its invasion by Germany in 1940.

Mines in the copper-gold-silver group also contribute largely to the total Dominion copper output; ores from these properties contain, in the aggregate, about 11 per cent of the annual gold production. The activities of the copper-gold mines are reviewed in the chapter on the gold mining industry. Production statistics on nickel, copper and the metals of the platinum group are given in this chapter.

General Review

In addition to production of nickel, copper and the platinum metals, there is an important recovery from these ores of the associated metals—silver, gold, selenium and tellurium; sulphur for the manufacture of sulphuric acid is also salvaged in the gaseous state from waste smelter gases. The total gross value of the various primary products of this Canadian industry, considered as a whole, was estimated at \$121,493,774 in 1944 compared with \$128,583,784 in 1943.

Two companies operated both mines and metallurgical plants in the Sudbury area in 1944. The International Nickel Co. of Canada, Limited, conducts smelting operations at Copper Cliff and Coniston, Ontario, while the Falconbridge Nickel Mines, Ltd., smelted their ores at the Falconbridge mine located a few miles east of the town of Sudbury. This last-named company treated their matte in a refinery located at Kristiansand, Norway, until the invasion of that country by Germany in 1940. Matte produced by the Falconbridge Nickel Mines Ltd. was treated since 1940 in the Canadian plants of the International Nickel Co. of Canada, Limited. Shipments of matte to Norway were resumed in July of 1945.

The relatively small amount of nickel oxide sometimes produced at Deloro, Ontario, is recovered from silver-cobalt-nickel-arsenic ores mined in northern Ontario. Smelter matte made by the International Nickel Co. of Canada, Limited is treated in plants located at Clydach, Wales; Huntington, West Virginia; and at Port Colborne and Copper Cliff, Ontario. Converter copper made by the International Nickel Co. is electrolytically refined at Copper Cliff, and refined nickel is produced by the company at Port Colborne. In 1944 the International Nickel Company of Canada Limited shipped ore from the Garson, Creighton, Levack, Frood, Stobie and Murray mines.

The nickel property of Harlin Nickel Mines Limited, located near Porquis Junction, Ontario, was operated from January 1 to August 31, 1944; crude ore produced by this company was shipped to the Copper Cliff smelter of the International Nickel Company of Canada. Mining operations were conducted during 1944 in Foy township, Ontario, by Nickel Offsets Limited; crude ore was consigned to the Copper Cliff smelter and work was suspended on October 31. Operations in Bowell township, Ontario, by North Range Nickel Mines Limited, were confined to diamond drilling.

In 1944 the industry, as a whole, provided employment for 15,457 persons and distributed \$29,217,445 in salaries and wages. Fuel and electricity consumed totalled \$12,795,637 and explosives, chemicals, drill steel and other process supplies used amounted to \$18,449,774. Female wage-earners in 1944 numbered 792 compared with 641 in 1943 and 96 in 1942. The industry reported that \$51,036 were spent on prospecting for new mineral deposits in 1944.

Copper recovered from the nickel-copper ores of Ontario totalled 280,790,592 pounds in 1944 compared with 276,032,919 pounds in 1943. Production in 1944 of nickel, in all forms from these same ores amounted to 274,589,040 pounds against the all-time high record of 288,018,615 pounds in 1943.

A considerable tonnage of blister copper produced in Manitoba was also treated in 1944 at Copper Cliff, Ontario, by the International Nickel Company of Canada Limited; scrap copper is also refined at Copper Cliff.

Table 127.—Principal Statistics of the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1942-1944 (*)

	1942	1943	1944
Number of firms.....	(a) 4	(a) 6	(a) 5
Number of mines.....	8	10	9
Number of smelters.....	3	3	3
Number of copper refineries.....	1	1	1
Number of nickel refineries.....	1	1	1
Capital employed.....	\$ 159,777,493	167,067,135	(c)
Number of employees—On salary.....	1,098	1,230	1,282
On wages.....	12,680	13,420	14,175
Total.....	13,778	14,650	15,457
Salaries and wages—Salaries.....	\$ 3,184,248	3,414,557	3,661,427
Wages.....	\$ 25,171,893	26,781,415	25,556,018
Total.....	\$ 28,356,141	30,195,972	29,217,445
Fuel and purchased electricity used (2).....	\$ 11,188,825	12,640,118	12,795,637
Process supplies used (1).....	\$ 15,911,153	17,872,418	18,449,774
Cost of freight and treatment (3) (d).....		130,321	118,108
Estimated gross value of matte exported and Canadian refinery products (b).....	\$ 128,340,860	128,583,784	121,493,774
Value of production less items (1) (2) and (3).....	\$ 101,240,882	97,931,927	90,130,255

(*) Does not include data for mines, power plants, etc., operated by subsidiary companies.

(a) All in Ontario.

(b) Includes value of customs material.

(c) Not recorded in 1944.

(d) Exclusive of data for International Nickel Company and Falconbridge Nickel Mines.

Table 128.—Output From Ontario Nickel-Copper Mines and Smelters, 1942-1944 (Short tons)

	1942	1943	1944
Ore shipped from mines.....	12,072,485	12,920,917	12,955,208
Ore treated (*).....	12,078,722	12,912,332	12,966,679
Converter copper produced in Ontario (a) from Ontario ores.....	146,362	130,905	133,879
Nickel produced in Ontario (b).....	102,478	106,069	104,677
Matte exported (c).....	61,226	56,833	48,287
Nickel content of matte exported.....	40,112	37,911	32,618
Copper content of matte exported (a).....	7,582	7,532	6,516

(*) Represents the tonnage of crude ore smelted together with the tonnage of ore milled.

(a) Copper content, including copper content of Ontario ores purchased, less reverts.

(b) Includes nickel content of salts and oxides produced from nickel-copper ores only.

(c) Less a relatively small tonnage of matte returned to Canada for retreatment.

Table 129.—Dividends Paid by Specified Nickel-Copper Mining Companies, 1944

	Dividends 1944	Total dividends paid to end 1944
	\$ (*)	\$ (*)
International Nickel Co. of Canada Ltd. only (†).....	28,038,849	360,060,883.70
Falconbridge Nickel Mines Ltd.....	500,637	9,137,234

(*) Canadian.

(†) Letters patent granted July 25, 1916.

Table 130.—Employees, Salaries and Wages, in the Nickel-Copper Mining, Smelting and Refining Industry in Canada, 1944

	On salary		Mine and smelter			Mill		Total	Salaries and wages
			Surface		Under-ground				
	Male	Female	Male	Female	Male	Male	Female		\$
Salaries employees—									
Mine and mill.....	445	50						495	1,431,118
Smelters and refineries.....	585	202						787	2,230,309
Total.....	1,030	252						1,282	3,661,427
Wage-earners—									
Mine and mill.....			1,833	59	4,954	190	97	7,133	13,247,577
Smelters and refineries.....			6,406	636				7,042	12,308,441
Total.....			8,239	695	4,954	190	97	14,175	25,556,018
Grand Total.....	1 030	252	8,239	695	4,954	190	97	15,457	29,217,445

Table 131.—Number of Wage-Earners by Sex and Months, Entire Industry, 1942-1944

Month	1942		1943		1944	
	Male	Female	Male	Female	Male	Female
January.....	12,112		13,381	511	14,006	770
February.....	12,199		13,379	527	14,048	779
March.....	12,214		13,210	599	13,843	754
April.....	12,143		12,844	628	13,447	740
May.....	12,560		12,690	648	13,171	782
June.....	12,966		12,844	668	13,186	791
July.....	12,870		12,648	673	13,095	814
August.....	12,287		12,510	688	13,012	828
September.....	12,234	101	12,167	708	12,731	835
October.....	12,961	262	12,159	695	12,771	822
November.....	13,216	379	12,521	670	13,319	799
December.....	13,444	411	12,978	676	13,543	788

Table 132.—Wage-Earners, by Months, in Nickel-Copper Mines Only, 1944 (*)

Month	Mine			Mill	
	Surface		Under ground	Male	Female
	Male	Female			
January.....	1,861	69	5,364	211	98
February.....	1,879	70	5,457	198	106
March.....	1,853	64	5,292	207	97
April.....	1,766	60	5,112	201	95
May.....	1,877	59	4,838	198	95
June.....	1,866	57	4,793	185	101
July.....	1,896	59	4,681	184	98
August.....	1,837	59	4,670	182	98
September.....	1,783	57	4,594	175	100
October.....	1,812	55	4,583	182	96
November.....	1,778	55	4,916	172	87
December.....	1,787	55	5,149	177	88

(*) Included in Tables 131 and 132.

Table 133.—Wage-Earners, by Months, in Nickel-Copper Smelters and Refineries Only, 1944 (*)

Month	Male	Female	Month	Male	Female
January.....	6,570	603	July.....	6,334	657
February.....	6,514	603	August.....	6,323	671
March.....	6,491	593	September.....	6,179	678
April.....	6,368	585	October.....	6,194	671
May.....	6,258	628	November.....	6,453	657
June.....	6,342	633	December.....	6,430	645

(*) Included in Tables 131 and 132.

Table 134.—Total Employees and Salaries and Wages Paid by Mines and by Metallurgical Plants, 1944

	Salaried Employees				Wage-earners			
	Male No.	Female No.	Total No.	Total salaries	Male No.	Female No.	Total No.	Total wages
				\$				\$
Mines.....	445	50	495	1,431,118	6,977	156	7,133	13,247,577
Metallurgical plants.....	585	202	787	2,230,309	6,406	636	7,042	12,308,441
Total.....	1,030	252	1,282	3,661,427	13,383	792	14,175	25,556,018

Table 135.—Other Expenditures (*), 1942 and 1944

	1942	1943	1944
	\$	\$	\$
Workmen's compensation.....	254,196	296,284	377,501
Silicosis assessment.....	56,204	40,660	69,878
Unemployment insurance.....	154,749	175,389	182,478
Aggregate cost of all supplies purchased.....	25,463,212	28,445,891	28,378,357
Aggregate cost of plant and equipment purchased.....	11,925,016	5,018,845	4,017,231

(*) Includes data relating only to companies who conduct both mining and smelting operations.

NICKEL

Production figures include nickel in matte exported from the Canadian smelters valued at 18 cents per pound; refined and electrolytic nickel produced in Canada, valued at the average price received for sales of nickel metal from the refinery during the year, and the nickel equivalent in oxides or salts produced, valued in the aggregate at the price obtained from the sales of oxides or salts. Distribution of nickel restricted to essential war uses, remained entirely under the direction of governmental agencies during 1944.

Table 136.—Production of Nickel (*), From Canadian Ores, 1926-1944

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1926.....	65,714,294	14,374,163	1936.....	169,739,393	43,876,525
1927.....	66,798,717	15,262,171	1937.....	224,905,046	59,507,176
1928.....	96,755,578	22,318,907	1938.....	210,572,738	53,914,494
1929.....	110,275,912	27,115,461	1939.....	226,105,865	50,920,305
1930.....	103,768,957	24,455,133	1940.....	245,557,871	59,822,591
1931.....	65,666,320	15,267,453	1941.....	282,258,235	68,656,795
1932.....	30,327,968	7,179,862	1942.....	285,211,803	69,998,427
1933.....	83,264,658	20,130,480	1943.....	288,018,615	71,675,322
1934.....	128,687,340	32,139,425	1944.....	274,598,629	69,204,152
1935.....	138,516,240	35,345,103			

(*) Usually includes a relatively small quantity of nickel recovered annually from silver-cobalt ores; Canadian nickel production comes entirely from Ontario ores with the exception of 1937 when a relatively small tonnage of nickel ore was exported from a property in British Columbia.

Table 137.—Production in Canada, Imports and Exports of Nickel, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	lb.	\$	lb.	\$
PRODUCTION—				
Nickel in matte exported.....	288,018,615	71,675,322	274,598,629	69,204,152
Refined and electrolytic nickel produced.....				
Nickel in oxides and salts sold or produced.....				
IMPORTS—				
Nickel and nickel silver in ingots.....	60,423	17,620	16,029	4,355
Nickel rods for wire (90% nickel).....	723	510	12,882	8,853
Nickel in bars and rods, strips and sheets.....	976,516	529,517	753,147	391,353
Nickel silver bars, rods and strips.....	4,612	2,594	3,709	1,739
Nickel chromium in bars.....	47,785	44,966	63,213	54,973
Nickel, manufactures of, not plated.....		45,846		33,411
Nickel-plated household hollow-ware.....		1,906		
Nickel household hollow-ware.....		44		
Nickel-plated ware, n.o.p.....		524,455		424,247
Total Nickel and Its Products.....		1,167,458		918,931
Exports—Total Metal in All Forms.....	271,094,400	68,346,346	265,197,100	68,400,634

Table 138.—Nickel Production by Principal Countries, 1937-1939 (American Bureau of Metal Statistics)

(Tons of 2,000 pounds)

		1937	1938	1939
Canada (a).....	(e)	112,453	105,286	113,053
New Caledonia (b).....		6,600	8,500	9,000
Burma (c).....		1,345	1,050 (g)	860
Greece (d).....		1,160	1,330	(f) 1,293
Norway.....		968	1,373	

(a) Production in all forms from Canadian ores, as reported by the Dominion Bureau of Statistics.

(b) Estimated content of ore and matte exported.

(c) Nickel content of speiss obtained as a by-product.

(d) Nickel and cobalt content.

(e) Not including production in British Columbia.

(f) Not yet reported.

(g) January–September only.

NOTE.—World data since 1939 are not available.

COPPER

Table 139.—Production of Copper From Ontario Ores Only, 1926-1944

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1926.....	41,312,867	4,828,964	1936.....	287,914,078	26,898,920
1927.....	45,341,295	4,946,533	1937.....	322,039,208	41,716,364
1928.....	66,607,510	8,770,149	1938.....	309,030,106	30,405,500
1929.....	88,879,853	14,622,572	1939.....	328,429,665	32,637,305
1930.....	127,718,871	15,187,259	1940.....	347,931,013	34,742,229
1931.....	112,882,625	9,096,463	1941.....	333,829,767	33,192,644
1932.....	77,055,413	4,407,928	1942.....	308,282,414	30,625,404
1933.....	145,504,720	10,118,847	1943.....	(a) 277,840,560	32,232,027
1934.....	205,059,539	14,822,704	1944.....	(b) 285,307,278	33,845,632
1935.....	252,027,928	19,295,965			

NOTE.—Almost entirely from nickel ores.

(a) Includes 276,032,919 pounds recovered from nickel-copper ores only.

(b) Includes 280,790,592 pounds recovered from nickel-copper ores only.

Table 140.—Total Production of New Copper in Canada, by Provinces and Method of Computation, 1943 and 1944

	1943		1944	
	Pounds	Value	Pounds	Value
		\$		\$
By PROVINCES—				
Quebec.....	131,163,776	15,411,744	108,055,172	12,966,620
Ontario.....	277,840,560	32,232,027	285,307,278	33,845,632
Manitoba.....	38,014,872	4,466,747	43,878,639	5,265,437
Saskatchewan.....	85,948,719	10,098,974	73,514,499	8,821,740
British Columbia.....	42,222,205	4,961,109	36,302,628	4,356,315
Northwest Territories.....			11,902	1,428
Total.....	575,190,132	67,170,601	547,070,118	65,257,172
By SOURCES (†)				
In blister and anode copper produced.....	513,106,247	60,289,984	493,946,346	59,273,337
In ores, concentrates and copper matte exported (*).....	47,020,656	5,524,926	40,090,591	4,810,849
In nickel-copper matte exported.....	15,063,229	1,355,691	13,033,181	1,172,986
Total.....	575,190,132	67,170,601	547,070,118	65,257,172

(†) Where computed.

(*) Contains a relatively small quantity of copper contained in gold and silver ores shipped to Canadian smelters.

Table 141.—Production (*) of Refined Copper in Canada for Years Specified

Year	Tons	Year	Tons
1915.....		1938.....	227,240
1916 (†).....	483	1939.....	231,684
1917.....	3,901	1940.....	261,878
1918.....	3,809	1941.....	278,224
1919.....	3,467	1942.....	268,447
1935.....	173,290	1943.....	251,495
1936.....	191,595	1944.....	256,244
1937.....	215,080		

(*) From all sources.

(†) First electrolytic copper produced commercially in Canada.

Table 142.—Canadian Copper Production Recoverable According to Origin of Ores and by Provinces 1943 and 1944

Province	From copper-gold-silver ores	From nickel-copper ores	From gold and other ores	Total
1943				
Quebec.....	130,301,726		862,050	131,163,776
Ontario.....	1,786,171	276,032,919	21,470	277,840,560
Manitoba.....	38,014,872			38,014,872
Saskatchewan.....	85,948,719			85,948,719
British Columbia.....	42,121,563		100,642	42,222,205
Northwest Territories.....				
Canada.....	298,173,051	276,032,919	984,162	575,190,132
1944				
Quebec.....	107,150,904		904,268	108,055,172
Ontario.....	4,508,996	280,790,592	7,690	285,307,278
Manitoba.....	43,878,639			43,878,639
Saskatchewan.....	73,514,499			73,514,499
British Columbia.....	35,997,974		304,654	36,302,628
Northwest Territories.....			11,902	11,902
Canada.....	265,051,012	280,790,592	1,228,514	547,070,118

Table 143.—Imports and Exports of Copper, 1943 and 1944

	1943		1944	
	Pounds	\$	Pounds	\$
IMPORTS				
Copper in blocks, pigs and ingots.....			4,500	762
Copper, scrap.....	3,500	177	26,700	2,604
Copper in bars or rods for the manufacture of trolley, telegraph and telephone wires, electric wires and electric cables.....	1,336,300	205,738	578,400	87,325
Copper bars and rods for the manufacture of electrical conductors.....	9,300	1,126	(*)	(*)
Copper bars or rods, n.o.p.....	330,300	76,062	193,300	41,581
Copper in strips, sheets or plates.....	64,000	16,416	165,400	49,657
Copper tubing, not manufactured.....	320,759	107,501	375,731	133,802
Copper rollers.....		176		1,289
Copper wire, n.o.p.....	32,116	13,760	90,248	49,850
Copper wire cloth, woven.....		745		475
Copper manufactures, n.o.p.....		489,807		274,771
Copper sub-acetate.....	420	132	440	140
Copper sulphate (blue vitriol).....	6,448,817	365,695	8,259,600	491,473
Total.....		1,277,335		1,133,729
EXPORTS				
Copper, fine, contained in ore, matte, regulus, etc.....	72,419,400	5,069,358	55,978,500	3,918,495
Copper blister.....	8,548,600	846,896		
Copper, old and scrap.....	1,133,500	48,844	1,927,400	118,899
Copper in ingots, bars, cakes, slabs and billets.....	128,665,800	12,731,158	270,466,200	29,049,257
Copper in rods, strips, sheets, plates and tubing.....	49,133,800	5,329,685	36,126,900	4,193,044
Copper wire and cable, insulated.....		1,438,161		2,200,550
Copper wire, bare.....		5,317,169		1,018,940
Copper wire, screen.....		8,668		8,332
Copper manufactures, n.o.p.....		26,510		38,426
Total.....		30,816,449		40,543,943

(*) Included with copper bars or rods, n.o.p.

Table 144.—World Production of Copper (a), 1937, 1938 and 1944, by Countries According to Origin of the Ore (American Bureau of Metal Statistics)

(Tons of 2,000 pounds)

Country	1937	1938	1944
United States.....	834,835	556,673	997,027
Mexico.....	51,538	45,662	43,487
Canada.....	262,432	290,200	273,972
Cuba.....	13,800	14,800	6,256
Newfoundland.....	7,165	6,000	5,500
Bolivia.....	4,076	3,178	6,800
Chile.....	455,562	387,409	537,500
Peru.....	39,354	41,368	34,900
Ecuador.....			4,065
Total America.....	1,668,762	1,345,290	1,909,509
Austria.....	2,283	(b)	
Finland.....	13,812	14,458	
France.....	(d) 1,100	(d) 1,100	
Germany.....	32,518	33,069	
Norway.....	22,260	23,148	
Russia.....	101,963	(d) 108,000	
Spain and Portugal.....	34,546	37,964	
Sweden.....	7,669	9,921	
Yugoslavia.....	43,442	46,288	
Other Europe.....	3,086	6,614	
Total Europe.....	262,679	280,562	(e)
Japan.....	83,665	(d) 84,900	
India, including Burma.....	11,200	8,700	
Turkey.....		2,543	(d) 15,000
Philippines.....	1,100	3,713	
Other Asia (c).....	32,959	44,092	
Total Asia.....	128,924	143,948	(e)
Belgian Congo.....	165,993	136,622	180,000
Rhodesia.....	234,405	237,362	
Other Africa.....	15,930	21,353	
Total Africa.....	416,328	395,337	(e)
Australia.....	22,000	21,900	(d) 40,000
Grand Total.....	2,498,693	2,187,037	(e)

(a) Production from ore excluding copper derived from junk.

(b) Included with Germany.

(c) Includes Cyprus.

(d) Conjectural.

(e) Data not available.

Table 145.—Available Statistics on the Consumption of Copper in Specified Canadian Industries, 1941-1944

Industry	1941	1942	1943	1944
BRASS AND COPPER PRODUCTS (x)—				
Ingots, wire bars, slabs, etc.....lb.	176,679,478	335,793,693	339,895,762	127,812,259
Scrap.....lb.	12,199,005	12,617,777	10,253,098	8,309,097
Pipe and tubing.....lb.	188,074	191,106	183,822	154,798
Plates and sheets.....lb.	971,838	846,308	804,125	815,359
Wire.....lb.	384,929	348,000	213,906	294,010
Other.....\$	61,163	57,438	69,778	55,120
WHITE METAL ALLOYS—				
Scrap, all kinds.....lb.	10,200,476	9,699,323	9,250,095	10,314,229
Copper—ingots and slabs.....lb.	590,178	4,470,119	5,297,447	2,232,446
ELECTRICAL APPARATUS AND SUPPLIES—				
Castings.....lb.	480,687	148,237	107,226	111,982
Ingots, slabs, wire bars, etc.....lb.	2,109,395	2,036,221	1,280,078	587,252
Rods.....lb.	61,700,539	62,982,899	67,704,908	44,254,722
Scrap.....lb.	91,333	149,731	55,598	29,810
Tubing and pipe.....lb.	641,402	542,064	339,100	284,308
Sheets and plates.....lb.	846,949	883,836	910,257	920,500
Wire, bare.....lb.	8,607,762	7,862,294	6,826,654	12,363,727
Wire, enamelled.....\$	902,013	711,706	1,014,440	1,024,920
Wire, other insulated.....\$	1,577,960	1,551,529	1,317,370	2,438,546
IRON AND STEEL AND THEIR PRODUCTS—				
Copper sheets, bars, etc.....lb.	17,400,122	18,629,920	15,804,341	14,287,852

(x) A relatively large part of the copper included under this industry is rolled into wire rods, which are sold to manufacturers of electrical cable, duplication to this extent results from the inclusion of these rods in the Electrical Apparatus Industry.

The peak Canadian production of copper for all time was in 1940, when the output stood at 643,316,713 pounds. From 1940 to 1943 all provinces showed a reduction in output with the exception of Saskatchewan. The Saskatchewan-Manitoba production is unique in Canadian mining history in that the ore body of the Flin Flon mine, the principal producer in these provinces, lies across the interprovincial boundary. In 1944 increases in copper output over 1943 were recorded only for Ontario and Manitoba.

The most important Canadian copper-bearing ore deposits are those of the Noranda, Waite-Amulet and Normetal mines in Quebec; the nickel-copper mines of Ontario; the Sherritt-Gordon in Manitoba; the Flin Flon on the Manitoba-Saskatchewan boundary, and the Britannia and Granby mines in British Columbia. Early in 1945 the Quemont Mining Corporation Limited located a new and important copper-gold-silver ore body on its property adjoining that of Noranda Mines Limited; the exploration and development of this deposit is now proceeding.

Canada has two copper refineries, one at Copper Cliff, Ontario, owned by the International Nickel Company, and one at Montreal East, Quebec, owned by the Canadian Copper Refiners Ltd. At the beginning of the first world war Canada had no copper refinery, whereas now she possesses excellent copper refinery facilities and large well-developed copper orebodies and smelters.

Curtailment during the war in brass and copper was instituted by the Canadian Metals Controller through the surveillance of export licences and through informal understanding with principal producers and fabricators. More formal methods were adopted so that consumption of brass and copper for non-essential purposes would be reduced. Control was effected through primary fabricators. All controls on the domestic use of copper and brass in Canada were removed in September, 1945.

METALS OF THE PLATINUM GROUP

The London Mining Journal reviews the platinum metals in 1944 as follows:

"So far as available statistics go there was a marked decline in the output of metals of the platinum group in 1944 as compared with the previous year, but without knowledge of what the Russian output was, it is impossible to say categorically that the world's supply declined. Platinum supplies so essential for the war, especially in aircraft production, were adequate for the enormous expansion that took place in allied aircraft production. . . . Russian production is again conventionally reckoned by the trade at 200,000 ounces of platinum, but no data are available here to show whether production increased or the reverse during the year. No difficulty appears to have arisen in securing what supplies may have been needed by industry both in Great Britain and in the United States in excess of the production from fields within their respective spheres. Russia probably carries large stocks of platinum and the output is likely to have been regulated in accordance with wartime economy. On the assumption, however, that the Russian output amounted to 200,000 ounces of platinum, she would have regained her old position of the world's principal producer.

"Third in importance comes the Transvaal where the Rustenberg platinum mines produced about 7,000 ounces of the platinum metals monthly, or roughly 84,000 ounces for the whole year. As the percentage of platinum is given as 63 per cent, this would represent roughly 53,000 ounces, to which may be added about 500 ounces as a product from the osmiridium concentrates from the Rand mines, giving South Africa a total of 53,500 fine ounces.

"Production from Columbia is believed to have maintained its previous figure of 50,000 ounces. The only other producer of importance is the Goodnews district of Alaska, in which we can only repeat last year's estimate of 20,000 ounces; nothing has been heard of any production from Abyssinia, which at best was small.

"The adequacy of the supply of the platinum metals generally is indicated by the prices remaining unchanged during the year. United States figures were: Platinum \$35 per ounce; palladium \$24; rhodium \$125 and ruthenium \$35 per ounce. In the second half of the year the price of iridium was lowered from \$165 to \$120. . . . The reservation of platinum for war purposes has meant that in the industrial jewellery and dental fields increased recourse has been made to palladium; this metal is being increasingly used as a catalyst in the growing number of hydrogenation plants. . . ."

Table 146.—Production of Metals of the Platinum Group From Ontario Copper-Nickel Ores, 1935-1944

Year	Platinum (*)		Palladium (†)	
	Fine ounces	\$	Fine ounces	\$
1935.....	105,335	3,444,455	84,772	1,962,937
1936.....	131,551	5,319,922	103,671	2,483,075
1937.....	139,355	6,751,750	119,829	3,179,782
1938.....	161,310	5,196,279	130,893	3,677,342
1939.....	148,877	5,221,712	135,402	4,199,622
1940.....	108,464	4,239,424	91,522	3,520,746
1941.....	124,257	4,747,860	97,432	3,396,304
1942.....	285,188	10,897,033	222,573	8,279,221
1933.....	219,706	8,458,681	126,004	5,233,068
1944.....	157,523	6,064,635	42,929	1,960,085

(*) In addition, a relatively small quantity of alluvial platinum is usually recovered annually in British Columbia; such recovery in 1943 totalled 7 ounces valued at \$270; nil in 1944.

(†) Includes other platinum metals except platinum and represents the entire Canadian production.

DOMINION BUREAU OF STATISTICS

Table 147.—Platinum Consumed in Canadian Jewellery and Silverware Industry, 1935-1944

Year	Value	Year	Value
	\$		\$
1935.....	45,627	1940.....	148,748
1936.....	101,129	1941.....	208,318
1937.....	112,295	1942.....	361,006
1938.....	85,503	1943.....	169,467
1939.....	160,688	1944.....	150,965

Table 148.—Production of Selenium and Tellurium from Nickel-Copper Ores, 1939-1944

Year	Selenium		Tellurium	
	Pounds	Value	Pounds	Value
		\$		\$
1939.....	126,930	224,539		
1940.....	136,350	260,429	3,491	5,607
1941.....	142,498	272,171	11,453	18,394
1942.....	76,000	145,920	9,500	15,200
1943.....	82,000	143,500	8,600	15,050
1944.....	65,000	117,000	9,900	17,325

Table 149.—Production of Gold and Silver From Nickel-Copper Ores, 1939-1944

Year	Gold		Silver	
	Fine oz.	Value	Fine oz.	Value (*)
		\$		\$
1939.....	77,094	2,786,177	2,496,632	1,010,886
1940.....	90,863	3,498,225	2,803,052	1,072,167
1941.....	77,960	3,001,460	2,633,815	1,007,698
1942.....	70,861	2,728,148	2,238,177	943,839
1943.....	55,776	2,147,376	1,648,888	746,122
1944.....	55,286	2,128,472	1,828,978	786,461

(*) Estimated.

CHAPTER FIVE

MISCELLANEOUS METAL MINING INDUSTRIES IN CANADA

Including General Statistics Relating to the Industries in this Group and Commodity Statistics Showing any Production by Provinces and Prices on:

Aluminum	Manganese
Antimony	Mercury
Beryllium	Molybdenum
Bismuth	Pitchblende
Boron	Selenium
Cadmium	Tantalum-Columbium
Calcium	Tellurium
Cerium	Tin
Chromium	Titanium (ilmenite)
Iron and steel	Tungsten
Indium	Vanadium
Lithium	Zirconium
Magnesium	

General Review

The mining of certain metal-bearing ores, other than those commonly classified as gold, silver, copper, nickel, cobalt, lead and zinc, have been grouped, for statistical purposes, as a single industry by the Dominion Bureau of Statistics. Their production in some instances is confined to a relatively few operators and the annual extraction of certain types often fluctuates in an erratic manner according to demand and supply. Included in this report, with the finally-revised statistics relating to the Canadian production of these ores or metals, are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals and metal-bearing ores produced in Canada during 1944 and classified as miscellaneous include antimony, bismuth, cadmium, chromite, iron ore, magnesium, manganese ore, mercury, molybdenite, pitchblende, selenium, tellurium, titanium ore, tin and tungsten concentrates. In addition to particulars relating to these metals or minerals, the bulletin contains notes of a summary nature on aluminum, beryllium, lithium, vanadium and a few of the rarer metals.

It is to be noted that the majority of the metals listed above as Canadian products and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and, for this reason, such statistics as relate to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry, or the non-ferrous smelting and refining industry.

The mining of certain ores, classified as strategic during the war years, and including molybdenite, tungsten minerals, etc., was curtailed or terminated in 1944. The production of these ores, described in some instances as "projects" was conducted principally by or under the supervision of the Wartime Metals Corporation, a Canadian Government organization.

The number of firms reported as active in the miscellaneous metals mining industries during 1944 totalled 27; \$2,899,013 were distributed in salaries and wages to 1,385 employees and the cost of fuels, process supplies, freight, treatment, etc., aggregated \$2,074,107. The gross value of production totalled \$5,360,993 and the corresponding net value of same was estimated at \$3,286,886.

ALUMINUM

The reduction of aluminum ores and the production of primary aluminum metal in Canada is confined to the province of Quebec. In this province the Aluminum Company of Canada Limited operates an ore treatment plant at Arvida and reduction works at Arvida, Shawinigan Falls, La Tuque, Isle Maligne and Beauharnois. These were all in continuous production throughout 1944.

Secondary fabricating plants are also operated by the company at Shawinigan Falls in Quebec and at Toronto and Kingston in Ontario. No aluminum ores are mined in the Dominion and Canadian production of aluminum represents the recovery of the metal from foreign ores. During recent years imports of bauxite (aluminum ore) into Canada have come largely from British and Dutch Guiana with lesser quantities from the United States. At Arvida, Quebec, the bauxite is treated by a standard chemical process to remove impurities prior to its reduction to the metal. Cryolite, necessary in the production of aluminum, is largely imported from Greenland; synthetic cryolite is also used in making aluminum. A very large amount of electrical energy is utilized in the production of new aluminum metal from bauxite concentrates and the extensive expansion in the development of hydro power resources recently completed in the Saguenay district of Quebec has provided the aluminum industry with a greatly increased supply of electrical power.

The principal bauxite producing countries are France, Hungary, United States, Yugoslavia, Italy, British Guiana, Dutch Guiana and Russia. Complete data relating to aluminum and bauxite production by countries have not been available since 1938. Canadian production of new aluminum during 1944 totalled 924,130,162 pounds compared with 991,499,296 pounds in 1943 and 93,812,965 pounds in 1937. The output during 1943 was the largest ever attained by the Canadian aluminum industry.

Aluminum prices, New York, January, 1945, were: per pound delivered, commercial and mill ingot, 99 per cent, 15 cents; in pigs, 14 cents. The London home market, ingot £110 per long ton (nominal).

Data relating to employment, etc., in the Canadian aluminum industry are included with those of the Canadian non-ferrous smelting refining industry, and are therefore not included with corresponding statistics shown in this report.

Table 150.—Production of Primary Aluminum in Canada, 1935-1944

Year	Pounds	Year	Pounds
1935.....	46,342,747	1940.....	218,288,565
1936.....	59,280,250	1941.....	427,746,554
1937.....	93,812,965	1942.....	681,192,951
1938.....	142,407,743	1943.....	991,499,296
1939.....	165,680,869	1944.....	924,130,162

Table 151.—Consumption of Aluminum in Specified Canadian Industries, 1943 and 1944

Industry	1943		1944	
	Pounds	Cost at works	Pounds	Cost at works
		\$		\$
Aluminum products (ingots) (a).....	70,423,825	14,676,377	71,351,867	11,795,374
White metal alloys*.....	1,108,762	212,754	1,221,910	390,237
Electrical apparatus and supplies.....		1,019,525		923,346
Brass and copper products (b).....		799,339		756,193
Iron and steel products (b) (c).....	11,487,493	3,373,018	12,114,244	3,587,692

(a) Largely for the manufacture of cooking utensils, cable, etc.

(*) In addition in 1944 there were consumed 6,309,852 pounds of scrap valued at \$415,789, and in 1943, 5,816,697 pounds at \$531,248.

(b) Includes scrap.

(c) Includes industries manufacturing cooking and heating apparatus, sheet metal products, etc.

Table 152.—Imports of Aluminum and Bauxite Into Canada, 1943 and 1944

Item	1943		1944	
	Cwt.	Value	Cwt.	Value
		\$		\$
Alumina.....	1,780	31,795	2,442	38,530
Bauxite ore.....	60,211,389	21,242,907	26,560,509	9,984,818
Cryolite.....	448,521	1,893,762	50,373	248,562
Aluminum pigs, ingots and blocks.....	23	650	1,324	27,085
Aluminum scrap.....	1,548	17,013	4,564	33,034
Aluminum angles, channels and beams.....	7,481	355,880	3,372	180,226
Aluminum bars, rods and wire.....	22,270	533,720	35,424	853,672
Aluminum leaf.....		3,054		47,845
Aluminum pipes and tubes.....	1,429	129,718	594	70,323
Aluminum plates, sheets and strips.....	12,578	438,034	27,007	945,287
Aluminum powder.....	38.5	2,083	28	2,435
Aluminum wire and cable.....	7	285		
Aluminum household hollow ware.....		3,551		11,635
Aluminum manufactures n.o.p.....		489,593		420,261

Cwt. = 100 pounds.

Table 153.—Exports of Aluminum From Canada, 1943 and 1944

Item	1943		1944	
	Cwt.	Value	Cwt.	Value
		\$		\$
Aluminum scrap.....	2,005	18,305	36,040	214,572
Aluminum in bars, ingots, blocks, etc. (b).....	7,507,670	124,460,894		
Aluminum wire and cable.....		2,082		59,498
Aluminum manufacture, n.o.p.....		4,780,904		9,441,522
Aluminum in bars, blocks, ingots and blooms (a).....			5,904,532	93,493,588
Aluminum in rods, sheets and circles (a).....			62,485	2,310,424
Aluminum kitchen utensils and hollow ware.....				799

(a) From January, 1944.

(b) To December 31, 1943.

Cwt. = 100 pounds.

Table 154.—World Production of Aluminum 1938, 1941 and 1944 (American Bureau of Metal Statistics)

Country	1938	1941 (b)	1944
	Metric tons	Metric tons	Tons 2,000 lb. (Available data)
United States.....	130,129	280,383	776,400
Canada.....	66,000	193,000	462,065
Total America.....	196,129	473,383	1,238,465
Austria (a).....	(c) 45,300	(c) 60,000	
France.....	165,600	300,000	
Germany (a).....	22,500	23,400	(e) 61,700
Great Britain (a).....	1,500	5,000	
Hungary.....	25,788	50,000	
Italy.....	29,035	35,000	
Norway.....	48,000	60,000	
Russia.....	800	1,120	
Spain.....	1,892	2,500	
Sweden.....	26,500	29,000	
Switzerland (a).....	1,200	3,000	
Yugoslavia.....			
Total Europe.....	368,095	569,020	
Japan (d).....	17,000	90,000	
Total World.....	581,224	1,132,403	

(a) Metallgesellschaft.

(b) Estimated, except for U.S.A., Canada, Great Britain and Spain.

(c) Austrian production included with Germany.

(d) Probably includes Manchuria and Formosa, and anyway is quite conjectural.

(e) 1943 data.

ANTIMONY

Production of antimony metal in Canada during 1944 totalled 1,937,933 pounds valued at \$281,000 compared with 1,114,166 pounds worth \$189,408 in 1943. Production in both years represents antimony electrolytically refined by the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia; the metal is recovered at Trail as a by-product from the flue dust of the company's silver refinery. It was reported that the antimony plant at Trail was closed down in September, 1944, largely as a labour economy measure.

Antimony ore in the form of stibnite occurs in various parts of Canada and for a number of years prior to 1917 small amounts of refined antimony and of antimony ore were produced intermittently in the Maritime Provinces. Small shipments of antimony ore have also been made during recent years from the Fort St. James district of northern British Columbia, Nova Scotia, and from the Yukon. In 1942 an antimony deposit at Gates Lake, in the Kenora district of Ontario, was investigated. No crude antimony ores were commercially produced in Canada in either 1943 or 1944.

The world production of antimony in 1938 (1939-1942 figures not available), as published by the United States Bureau of Mines, amounted to about 38,000 tons. The production in 1937 was 42,100 tons, the highest figure since the 1914-1918 war years. The decline in output from China has been more than made up by the large increase in production in other countries. World production at present is probably in excess of 50,000 tons a year.

Most of the production of antimony has come from China, although Bolivia and Mexico have been important producers for years. In recent years, there has been a marked increase in output from Bolivia, Mexico, Yugoslavia, and Algeria and, to a lesser extent, from several other countries. In 1939 Bolivia produced 29 per cent of the world output of antimony; Mexico, 23 per cent; China, only 20 per cent; and Yugoslavia, 10 per cent. Prior to the war, most of the refined antimony was produced in the United States, Great Britain, France, and Belgium from ores of foreign origin.

Canada's requirements are now supplied mainly from the electrolytic plant at Trail, British Columbia, according to the Bureau of Mines, Ottawa.

Antimony is an important war metal. It is used largely in alloys for storage-battery plates, bearing and babbitt metals, and solder, and it is also used in the manufacture of rubber goods, paints, and fixtures. The greatest single gain in use in 1944 was of antimony oxide in the flameproofing of textiles, principally duck for military purposes. The use of antimony in the manufacture of chemicals increased considerably during the past two years. The principal compound is the oxide of antimony, which is employed extensively as a pigment in sanitary enamelware and in nitrocellulose enamels. Demand for antimony in the post-war years will possibly exceed that of the pre-war level partly because of the large requirements for storage batteries and other metal products and partly because of the new applications developed during the war.

Prices in Canada for imported antimony metal of a purity of 99.6 per cent or higher (grade R.M.M.) as set in August 1944 by the Wartime Prices and Trade Board (Order No. A-1315) were as follows:—

Quantity lbs.	Montreal cents per lb.	Toronto cents per lb.
10,000 and over.....	17.90	17.60
10,000-2,000.....	18.65	18.35
2,000-1,000.....	20.65	20.35
Less than 1,000.....	21.15	20.85

Chinese grade with a purity of not less than 99.0 per cent:—

Quantity lbs.	Montreal and Toronto cents per lb.
10,000 and over.....	18.00
10,000-2,000.....	18.75
2,000-1,000.....	20.75
Less than 1,000.....	21.25

The New York price of antimony metal (ordinary brand) in 1944 remained fixed at 15.84 cents per pound throughout the year. The price for Chinese brand, duty paid, remained at 16.5 cents. The price of antimony ore, c.i.f. New York in 1944 per unit of antimony contained was: for 50 to 55 per cent Sb, \$2.10 to \$2.20; for 55 to 60 per cent Sb, \$2.15 to \$2.20; and for 60 to 65 per cent Sb, \$2.20 to \$2.30.

It was reported that all restriction on the use and distribution of antimony in Canada was removed in August, 1945.

Table 155.—Antimony Produced in Canada, 1937-1944

Year	In Ores Exported		Metal Produced in Canada		Total	
	Pounds	\$	Pounds	\$	Pounds	\$
1937.....	48,163	7,334			48,163	7,394
1938.....	24,560	2,200			24,560	2,200
1939.....	25,405	3,139	1,200,180	148,330	1,225,585	151,469
1940.....	44,700	3,800	2,549,792	392,668	2,594,492	396,468
1941.....	15,292	2,141	3,169,785	443,770	3,185,077	445,911
1942.....	78	13	3,041,030	516,975	3,041,108	516,988
1943.....			1,114,166	189,408	1,114,166	189,408
1944.....			1,937,933	281,000	1,937,933	281,000

Table 156.—Antimony Used in Specified Canadian Industries, 1943 and 1944

Industry	1943		1944	
	Pounds	\$	Pounds	\$
White metal alloys.....	1,814,414	269,718	2,382,290	371,243
Electrical apparatus and supplies.....	251,763	39,455	345,404	135,530

Table 157.—Imports of Antimony and Specified Antimony-Bearing Products Into Canada, 1943 and 1944

	1943		1944	
	Pounds	\$	Pounds	\$
Antimony or regulus of, not ground, pulverized or otherwise treated.....	240,700	38,755	1,558,198	237,334
Antimony oxide and titanium oxide (*).....	16,889,500	1,533,462	20,174,795	1,871,434
Antimony salts—tartar emetic, etc.....	10,990	6,066	68,765	26,749
Type metal in blocks, bars, plates and sheets.....	268	63		
Plates, cylinders (engravers).....		144,952		137,635
Stereotypes for books (sq. inches).....	1,756,520	131,654	2,494,489	183,211
Stereotypes for advertisements (sq. inches).....	1,827,222	78,143	1,691,220	73,324
Printing plates for publications.....		162,648		208,155
Storage batteries and parts.....		513,463		356,068

(*) Including white pigments containing not less than 14 per cent by weight of titanium.

BERYLLIUM

Beryl, a silicate of aluminum and beryllium, is the commonest beryllium mineral, and is the only present commercial source of the element. It generally contains from 10 to 12 per cent of beryllium oxide, corresponding to from 4 to 4.5 per cent of beryllium. The occurrence of beryl is restricted to pegmatite dykes, in which it is usually found as disseminated crystals, sometime of very large size. Only rarely, however, is the beryl content of pegmatites sufficient to enable the deposits to be worked for this mineral alone, and a large part of the comparatively small world production has been obtained as a by-product from the mining of feldspar, mica, or lithium minerals.

Canada produces no beryl and very little beryl is used or required by domestic industries. Most of the world supply in recent years has come from Brazil, Argentina, India, the United States, and South Africa.

The most noteworthy occurrences of beryl in Canada are in Ontario, south-eastern Manitoba, and the Northwest Territories.

In Ontario, intermittent work was done prior to 1941 on a beryl pegmatite in Lyndoch township, Renfrew county. A few tons of clean cobbled crystals were obtained, and about 200 tons of milling grade rock was stockpiled. Most of the work on the property was done by the present owners, Canadian Beryllium Mines and Alloys, Limited, 901 Royal Bank Building, Toronto, who, however, have reported no sales. A detailed examination of the main, easterly workings, made in 1943 by the Bureau of Mines, Ottawa, and the Metals Controller's Office, indicated an average content of 0.188 per cent beryl in the total rock excavated, with a maximum for the richest quarry sections of 1.24 per cent. Grade of selected clean beryl crystals was 10.41 per cent BeO.

In Manitoba, a little work was done several years ago on beryl showings in pegmatites opened originally for feldspar and lithium minerals in the Winnipeg River and Oiseau (Bird) River areas, but no shipments were reported.

In the Northwest Territories, exploration in the area north and east of the Yellowknife gold camp has disclosed numerous occurrences of beryl in pegmatites which also contain lithium minerals and tantalite-columbite. Some of these are considered to be of possible economic interest.

In Quebec, scattered occurrences of beryl are known in Lacorne and Preissac townships, Abitibi county, often associated with molybdenite. None of these, however, is believed to be of economic importance.

Beryllium is used chiefly in the form of beryllium-copper alloys, the most important of which contains about 2 per cent beryllium. A beryllium-aluminum alloy containing 5 per cent beryllium is used as a deoxidizer in making aluminum-magnesium products. Straight beryllium metal has only limited applications, notably for the windows of X-ray tubes, where it is used for its transparency to the rays.

Various beryllium salts, principally the oxide and carbonate, are used in industry. A growing demand has developed for the oxide for the preparation of zinc-beryllium silicate, used as a coating for fluorescent lighting tubes and lamps, and for fluorescent screens. The oxide and carbonate, activated by uranium salts or rare earths, act as "phosphors" and are utilized in luminescent paints. The oxide is a super-refractory, with a melting-point of 2,570°C., or 520 degrees above that of aluminum, and is used in crucibles, insulators, electrodes, furnace linings, and as a filament coating in lamps. Beryllium acetate is used as a coagulating, hardening bath for sodium alginate, a new English textile made from seaweed.

Ground beryl is used as a batch ingredient in sparkplugs and other ceramic specialties, to which it imparts high electrical and impact resistance and transverse strength. Some is also used in cooking utensil enamels. Consumption for such uses in the United States is estimated at about 100 tons a year.

Most of the present world production of beryl is marketed in the United States, where the following companies engaged in the primary production of beryllium metal, alloys, and compounds are the chief purchasers: Beryllium Corporation of Pennsylvania, Temple (Reading), Pennsylvania; Brush Beryllium Company, 3714 Chester Avenue, Cleveland, Ohio; and Clifton Products Incorporated, Painesville, Ohio. All of these companies considerably expanded their production facilities in 1944, under Government subsidy.

War demands occasioned a sharp increase in the price of beryl during the 1940-1944 period. Metals Reserve Company quotations rose progressively from the pre-war figure of \$30 to \$35 per short ton, f.o.b. mines, for ore with 10 to 12 per cent BeO content, respectively, to \$145 per ton for 10 per cent grade, or \$14.50 per unit of contained BeO, in 1944. Completion of an adequate United States Government stockpile reserve, and return of purchase to consumers at the end of 1944, is expected to result in a material lowering of the above price in 1945.

In June, 1945, it was announced by the United States War Production Board that the supply of beryllium exceeded essential requirements, and that the controls on the use of the metal had been removed through the revocation of order M-160. On June 4, 1945, it was announced that the United States War Production Board, in amending General Imports order M-63, removed beryllium ore, metal, and salts from import control. (Bureau of Mines, Ottawa)

BISMUTH

Production of bismuth in Canada during 1944 totalled 123,875 pounds valued at \$154,844 compared with 407,597 pounds worth \$562,484 in 1943. Production during recent years usually consisted of the metal recovered from silver-lead ores smelted by the Consolidated Mining and Smelting Company of Canada Limited at Trail, British Columbia, together with the bismuth content of a silver-lead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario. Production in 1944 came entirely from the Trail metallurgical plants. The total output of bismuth in the Dominion to the end of 1944 amounted to 2,476,820 pounds worth \$3,064,123.

Statistics of the world production of bismuth are incomplete, but the output is estimated at about 1,800 tons annually. The United States, Peru, Canada, and Mexico, supply about 90 per cent of the world output, their order of importance as producers being as given. The remainder of the output is obtained from Argentina, Australia, Belgium, Bolivia, China, France, Germany, Japan, Spain, and other countries.

The demand for bismuth increased considerably during the war period owing to its greater use in metallurgical and pharmaceutical applications. Bismuth is used mostly in the manufacture of pharmaceutical products. A much larger portion than formerly is now used in the making of so-called fusible or low-melting alloys. Fusible bismuth alloys usually include lead, tin, cadmium, mercury, or antimony. An alloy of bismuth, lead, tin, and antimony has been introduced for use in mounting dies and punches. Alloys containing bismuth are used to a greater extent than formerly in the aircraft, machine tool, munitions, and other industries. Additions of 0.1 to 1.5 per cent bismuth to stainless steel, copper and aluminium alloys improve machinability. There are numerous alloys of bismuth containing from 33 to 56 per cent bismuth.

The price of bismuth in 1944 (London price in Canadian funds) remained at \$1.38 a pound. The price at New York remained fixed at \$1.25 a pound throughout 1944. The American product is protected by a duty of $7\frac{1}{2}$ per cent ad valorem.

Imports of bismuth salts into Canada during 1944 were appraised at \$2,667 compared with \$15,675 in 1943; there were no imports of bismuth metal in 1944. Data relating to the bismuth content of alloys imported are not available. No separate records of exports of either bismuth or bismuth salts are available.

Table 158.—Production of Bismuth in Canada, 1931-1944

Year	Pounds	\$	Year	Pounds	\$
1931.....	118,207	157,650	1938.....	9,516	9,754
1932.....	16,855	7,340	1939.....	† 409,449	466,362
1933.....	78,303	81,526	1940.....	58,529	81,004
1934.....	253,644	301,215	1941.....	7,511	10,396
1935.....	13,797	13,245	1942.....	347,556	479,627
1936.....	364,165	360,524	1943.....	407,597	562,484
1937.....	5,711	5,654	1944.....	123,875	154,844

(†) High record output.

Table 159.—Bismuth Used in the Manufacture of Canadian Medicinal and Pharmaceutical Preparations, 1942, 1943 and 1944

Item	1942		1943		1944	
	Pounds	\$	Pounds	\$	Pounds	\$
Bismuth metal.....	24,420	30,534	56,019	70,107	45,412	56,820
Bismuth salts.....	18,153	35,793	22,080	43,786	22,936	44,781

Canadian white metal alloy foundries consumed approximately 40,224 pounds of bismuth metal in 1944 compared with 55,115 pounds in 1943 and 25,979 pounds in 1942.

BORON

According to the United States Bureau of Mines, boron alloys are supplied by United States manufacturers, small quantities being used in the non-ferrous metals industries and in steel making. In cast iron, boron opposes graphitization on solidification and exerts an energetic whitening effect, producing a hard strong iron but reducing malleability. Recently boron has been found to be one of the so-called minor elements that stimulate plant growth and inhibit the development of certain plant diseases.

"The Mineral Industry" reported in 1941 that tests demonstrated that the use of boron deoxidizers and the incorporation of 0.002-0.007 per cent carbon steel increases the hardenability, ductility and toughness; the boron is best supplied as a complex alloy of B-Mn-Si-Ti, rather than as ferroboreon.

Boron carbide, boron carbide shapes and calcium boride are now produced in Canada.

World reserves of boron minerals are abundant, but known sources are confined to a few countries, chiefly the United States, Chile, Argentina, Peru, Italy and Turkey, although Borax also has been reported in Tibet, Persia, India and Ceylon.

Imports of Borax into Canada during 1944, in packages of 25 pounds or over, totalled 9,570,148 pounds valued at \$280,930. Borax was quoted in the United States in 1945 at \$41.50 per ton, granular technical, March 1945—United States prices:—Ferroboreon, per pound of alloy, f.o.b. shipping point, ton lots \$120. Nickel boron, per pound of alloy, f.o.b. shipping point: ton lots, \$2.00 (15-18% boron). Manganese-boron, per pound of alloy, f.o.b. shipping point, \$1.89-ton lots (15-20% boron).

CADMIUM

"Cadmium is present in small amounts in most zinc ores and in some lead ores, and is obtained as a by-product in the production of these metals.

"Metallic cadmium is produced by Consolidated Mining and Smelting Company at Trail, British Columbia, and by Hudson Bay Mining and Smelting Company at Flin Flon, Manitoba. The plant at Trail started to produce early in 1928 and like the plant at Flin Flon which has

been in operation since 1936, treats the cadmium residue from the zinc refinery, the procedure being similar. The cadmium plant at Flin Flon was in continuous operation and treated all current purification precipitates from the zinc plant.

"Canadian production of cadmium in 1944 was 526,970 pounds valued at \$579,677, compared with 786,611 pounds valued at \$904,602 in 1943. The exports of cadmium in 1944 were 383,324 pounds valued at \$412,332, compared with 572,215 pounds valued at \$626,379 in 1943.

"The world production in 1944 is estimated at 5,500 short tons, the production in 1938, the latest year for which complete figures are available being 4,200 short tons. The chief Allied producing countries are: the United States, Canada, Mexico, Belgium, Australia (Tasmania), Poland, Norway, England, Russia, and France. The Mexican output is contained in ores exported for treatment mainly to the United States.

"Cadmium production is limited entirely to the by product recovery from electrolytic zinc and from the manufacture of lithopone, and is thus dependent on the output of these products.

"Cadmium is used mainly in electroplating and in the manufacture of alloys and compounds. The most common use of cadmium is as a protective coating for steel, and to a much lesser extent for copper alloys. The use of cadmium alloys in motor vehicle bearings and for solders has created a strong demand for the metal. Cadmium is used also in the arts, paints, ceramics, and dyeing, etc. In the United States, the consumption of cadmium is distributed approximately as follows: electroplating, 87 per cent; alloys and solders, 7.5 per cent; pigments and chemicals, 5.5 per cent. Cadmium is marketed in metallic form, 99.5 per cent pure and better, and as a sulphide. The principal compounds are cadmium sulphide, cadmium oxide, cadmium lithopone, and cadmium selenide.

"Cadmium sulphide and cadmium sulphoselenide are standard agents for imparting bright resistant yellow and red colours respectively to paints, ceramics, inks, rubber, leather, and other products. Paper coated with cadmium sulphide acts as a mustard-gas detector. Cadmium nitrate is used in white fluorescent lamp coatings. The oxide, hydrate, and chloride are used in electroplating solution; the carbonate in ceramics; and the halides in photography.

"The price of cadmium in 1944 (in Canadian funds) averaged \$1.10 a pound, compared with \$1.15 in 1943. The price of metallic cadmium, f.o.b. New York, in commercial sticks remained at 90 cents a pound throughout, 1942-1943, and 1944. The American product is protected by a duty of 7½ cents a pound. Previous to the Trade Agreement of November 1938, the duty was 15 cents a pound." (Bureau of Mines, Ottawa)

Table 160.—Cadmium Production in Canada, 1928-1944

Year	British Columbia		Manitoba		Saskatchewan	
	Pounds	\$	Pounds	\$	Pounds	\$
1928 (*)	491,894	341,374				
1929	773,976	675,294				
1930	456,582	337,871				
1931	323,139	180,958				
1932	65,425	26,824				
1933	246,041	78,733				
1934	293,611	95,665				
1935	530,530	441,203				
1936	526,034	468,170	148,193	131,838	111,749	99,457
1937	436,431	715,747	164,223	269,326	144,553	237,067
1938	510,342	410,090	115,166	92,543	73,630	59,166
1939	799,253	563,241	73,880	52,029	66,608	46,939
1940	773,791	905,734	57,742	67,154	71,594	83,264
1941	1,081,374	1,269,533	61,085	71,714	108,832	127,769
1942	972,413	1,147,447	29,236	34,498	147,314	173,831
1943	598,673	658,474	20,985	24,130	166,955	191,998
1944	386,470	425,051	20,921	23,013	119,639	131,603

(*) First production.

Table 161.—Cadmium Consumed by Specified Canadian Industries, 1940-1944—(Pounds)

Industry	1940	1941	1942	1943	1944
White metal alloys.....	121,008	243,717	347,725	267,586	190,183
Steel foundries.....	6,000	32,000	18,000	15,477	14,000
Iron foundries.....	9,528	12,000	34,000	23,178	22,000
Non-ferrous smelters.....			2,000		
Other industries.....	5,483	11,000	12,000	34,709	34,000
Total Accounted for.....	142,019	298,717	413,725	340,950	260,183

CALCIUM

The commercial production of calcium in Canada was commenced for the first time in 1945 when the metal was recovered from dolomite by Dominion Magnesium Limited in its plant located at Haley, Ontario.

Calcium metal was imported into the United States from France and Germany prior to the second world war. However, in 1939 a new plant was built for the production of the metal at Sault Ste. Marie, Michigan, by the Electro Metallurgical Company. Metallic calcium is utilized as a scavenger in steel and secondary aluminum, to produce magnesium castings and calcium hydride, and to harden lead. Calcium is used as a deoxidizer and final addition in obtaining particularly clean steels and in imparting better working properties to high nickel-chromium steels. Calcium-silicon (28-35 per cent calcium and 60-65 per cent silicon) and calcium-manganese-silicon are likewise employed for this purpose, although the unalloyed metal may have specific effects. Calcium-bearing alloys are now being made in Canada.

New York quotation for calcium, September, 1945, was \$1.85 per pound, ton lots. Data relating to imports into Canada of calcium are not shown separately in Canadian trade reports.

CERIUM (Monazite)

"Cerium is obtained from monazite, a monoclinic phosphate of cerium metals containing about 32 per cent cerium oxide (Ce_2O_3) and up to .18 per cent thoria (ThO_2). Monazite is distributed widely in igneous rocks throughout the world, especially in gneisses that have been intruded by pegmatites, but usually it forms only a small fraction of one per cent of the containing rock and only the natural concentrations in stream gravels and beach sands have paid for exploration. The chief commercial sources of monazite sand are beach deposits in Brazil and India. There are a few occurrences of monazite in Nova Scotia, Quebec and British Columbia, none of which is of commercial interest. It is usually found as small crystals in granites and pegmatites in the Canadian Shield and small quantities occur in association with the black sands of the Quesnel river, Lilloet district, British Columbia. In the United States there are commercial deposits in Carolina, Florida, and Idaho, and known occurrences in many other States.

"Cerium is usually regarded as belonging to the general group of "rare earths", as it invariably occurs in nature associated with the other fourteen members of the group and is very similar to the other rare-earth elements in many of its chemical properties.

"In Canada, Shawinigan Chemicals, Limited, Shawinigan Falls, Quebec, has been producing cerium products from cerium chloride since 1940. The output is sold to Cerium Company, Limited, of Montreal, for the manufacture of sparking flints.

"Prior to the war the leading producers of rare-earth products for the European market were located in Berlin, London, and Paris, and those for the American market, in Chicago. In the United States the present supply of cerium products is provided by Cerium Metals Corporation, Niagara Falls, N.Y.

"World production of monazite is approximately 5,000 tons a year.

"Thoria, which was used in gas mantles, was formerly the only commercial constituent of monazite, and monazite is still marketed on the basis of its thoria content, although its content of ceria (Ce_2O_3) and of other rare-earth oxides is of chief interest at present. Probably 50 per cent of monazite derivatives are consumed, chiefly as fluorides, in the cores of arc carbons to increase lighting intensity in searchlights, motion-picture projectors, and therapeutic lamps. About 25 per cent of the consumption of monazite derivatives is used in pyrophoric (sparking) alloys or in ferroceriums for use in sparking flints for lighters. The remainder is used for a variety of purposes, but principally for making optical glassware. Cerium metal is used in the evacuation of radio tubes.

"Nominal prices for monazite as given by Metal and Mineral Markets, New York, remained at \$60 per short ton, 8 per cent minimum thoria, throughout 1944. No quotations are published for most of the rare-earth products, although prices for small lots may be obtained on request from mineral dealers and chemical manufacturers." (Bureau of Mines, Ottawa)

CHROMITE

"The improvement in the Allied supply situation, which started in 1943, continued to such an extent in 1944 that the government-operated Chromeraine mine at Black Lake, Quebec, was closed in August. At the end of the year the only shippers were Chromite, Limited, near Richmond, Quebec, and Orel Pare, operating the 'Montreal' pit in the Black Lake district for Union Carbide Company. Chromite, Limited discontinued operations in the spring of 1945.

"Pure chromite (FeO , Cr_2O_3) contains 68 per cent chromic oxide, but in nature it always contains, besides iron, varying amounts of magnesia and alumina. It is a heavy, almost black, lustrous and brittle mineral and the ore usually occurs in dunite bands in serpentine rocks. Fresh dunite is a fine-grained, dark grey-green olivine rock. Chromite is distinguished in the field from other black minerals of similar appearance by its chocolate-brown powder or streak when struck or scratched with a hammer.

"Most of the deposits from which production has been obtained are between Quebec City and Sherbrooke in the Eastern Townships of Quebec.

"Chromite, Limited obtained its output from the old Sterrett mine in Cleveland township. The chromite in the mine occurs as fairly uniformly disseminated zones, scattered through which are plums of the massive mineral. The ore zone has been traced on the surface for about 1,700 feet and varies in width from 5 to 20 feet. The mine has been developed at 5 levels to a depth of 500 feet.

"The ore in the Chromeraine mine is chiefly low-grade, banded and disseminated chromite with a small amount of the massive mineral. The zone has been traced intermittently for 2,000 feet, has an average width of 30 feet, and in places is 60 feet wide. A small amount of diamond drilling has indicated that the ore extends to a depth of at least 440 feet. The ore was extracted by caving methods to a depth of 375 feet.

"In Manitoba little prospecting was done on the large bodies of low-grade chromite deposits that were discovered early in 1942 north of Oiseau (Bird) River in the southeastern part of the province. Various zones have been traced for lengths of several thousand feet. The ore is high in iron and an economical method of bringing the chrome-iron ratio to within market requirements has not been devised.

"About 78 per cent of the total imports of 41,520 tons valued at \$643,560 came from Southern Rhodesia and Transvaal, and nearly all the rest from India. All of the exports, which amounted to 18,868 tons, were to the United States.

"Production was started in the 100-ton mill of Chromite, Limited early in 1942 and its capacity was increased to 150 tons late that year. In 1944 about 37,000 tons of ore averaging 15 per cent Cr_2O_3 was treated, mostly from between the second and fifth levels south of the shaft. Over 12,000 tons of concentrate containing 48 per cent Cr_2O_3 was shipped to the United States. The development loan received from the Dominion Government in September, 1942, was all repaid by September, 1944, after which the mine was taken over by Basin Montana

Tunnel Company, which had originally financed the operations. The contract for shipments to the United States Metals Reserve Company was not renewed and the mine was closed in the spring of 1945. Total shipments of concentrates and high-grade crude ore since the outbreak of the war were nearly 36,000 tons.

"Wartime Metals Corporation operated the old Reed-Belanger deposits (Chromeraine project) 2 miles southwest of Black Lake. Production in the 600-ton mill was started in May, 1943, and in that year 77,500 tons of ore averaging about 8 per cent Cr_2O_3 was treated, in addition to which about 750 tons of custom ore averaging 18 per cent Cr_2O_3 was treated. In 1944, until operations ceased near the end of August, 87,500 tons was milled. No custom ore was received in 1944, but 2,400 tons of such ore that was received in 1943 was treated. About 11,000 tons of concentrate averaging 47 per cent Cr_2O_3 was shipped in 1944, compared with about 8,000 tons in 1943.

"Orel Pare shipped about 4,000 tons of high-grade crude ore direct to a Canadian consumer from Union Carbide Company's 'Montreal' pit, 5 miles southeast of the Chromeraine project. The old workings were reopened in the fall of 1941 and since then regular monthly shipments have been maintained. The deposit was first opened 50 years ago, and 20,000 tons was shipped from it during the last war. From the fall of 1941 to the end of 1944 a total of about 14,000 tons of ore was shipped. About 500 tons of high-grade crude ore was shipped by Chrome Association, Limited from the old Greenshields mine, and three car lots were shipped by LaBonte and Metevier from the Hall mine, both in Coleraine township.

"In the United States the output of the 80 producers in 1944 amounted to about 40,000 tons, compared with a peak output of 160,000 tons from 175 producers in 1943.

"The world annual production of chromite just prior to the present war was about 1,300,000 tons. Russia, Turkey, Southern Rhodesia, and the Union of South Africa were each producing 200,000 tons or more a year, and the Phillippines, Cuba, New Caledonia, Yugoslavia, Greece, and India 50,000 tons or more each. Turkey is one of the most important sources of high-grade chromite.

"Chromium is one of the principal alloying elements in a great variety of steels, chief of which in the amount of chromium used are the highly important stainless and corrosion-resistant steels. It is the vital ingredient with nickel and molybdenum in the making of armour plate, armour-piercing projectiles, and high-speed tool steels, and is used as a hard, toughening element in tank axles and frames, in aeroplane parts, and in other essential war materials. Large quantities of chromite, with certain specifications as to physical and chemical properties, are used in the making of refractories. Chromite is the source of such chemicals as sodium and potassium chromates.

"Chromium Mining and Smelting Corporation, Sault Ste. Marie, Ontario, produces an addition agent known as Chrom-X.

"Metallurgical chromite should contain a minimum of 48 per cent Cr_2O_3 and a chrome-iron ratio of not less than 3 to 1. When possible, lower grade ores are mixed with those of the highest grade, the proportion depending upon whether the ferrochrome produced is to be used for low- or for high-carbon steels. The maximum allowance for sulphur is 0.5 per cent and for phosphorus 0.2 per cent. Although lump ores are preferred, fines and concentrates are used in quantity and in some instances they are briquetted before use. The low iron content of the ore or concentrate is of the utmost importance.

"Specifications for refractory ore suitable for bricks depend upon the kind of brick to be made. The silica should be as low as possible. The chromite should be present in an evenly and finely distributed form, not a coarse grains mixed with blobs of the silicate. The ore should be hard and lumpy, and the lumps should be plus 12 mesh. Provided the impurities are within the above specifications, the Cr_2O_3 content may vary within certain limits, but it is generally over 40 per cent.

"Standard grades of ferrochrome contain a minimum of 60 to 70 per cent chromium and are produced in two grades, one being high (4 to 6 per cent) in carbon, and the other low (less than 2 per cent). Canadian production of high-carbon ferro was suspended early in the year.

"The principal Canadian buyers of chromite for metallurgical use are: Chromium Mining and Smelting Corporation, Sault Ste. Marie, Ontario, and Electro-Metallurgical Company of Canada, Welland, Ontario. The only important purchaser of refractory ore is Canadian Refractories, Limited, Canada Cement Building, Montreal, Quebec. The types and grades of ore acceptable to these buyers are indicated under 'Specifications'.

"United States prices of domestic and imported ores of 48 per cent Cr_2O_3 and 3 to 1 ratio are \$43.50; ores of lower grade and ratio vary down to a minimum of \$28 a long, dry ton at seaboard. Canadian prices of 47 to 48 per cent Cr_2O_3 concentrates are \$25 to \$40 a long ton, f.o.b. mines, depending upon the Cr-Fe ratio and percentage of certain impurities." (Bureau of Mines, Ottawa.)

Table 162.—Production of Chromite in Canada, 1928-1944

Year	Short tons	\$	Year	Short tons	\$
1928			1937	(*)	43,250
1929	126	900	1938		
1930			1939		
1931			1940	335	5,780
1932	78	1,113	1941	2,372	42,679
1933	30	343	1942	11,456	343,568
1934	111	1,578	1943	29,565	919,878
1935	1,144	14,947	1944	27,054	748,494
1936	(*)	13,578			

(*) Quantity not published.

Table 163.—Consumption of Certain Chromium Products and Chrome Ore in Specified Canadian Industries, 1943 and 1944

Industry	Item	1943		1944	
		Pounds	\$	Pounds	\$
Ingots and castings	Chrome ore	2,738,000	63,838	2,408,000	56,831
Ingots and castings	Ferrochrome	12,994,000	1,417,215	8,344,000	858,626
Paints, pigments and varnishes	Chrome colours	2,563,058	535,527	2,430,180	531,160
Paints, pigments and varnishes	Sodium bichromate	941,456	95,805	832,473	84,523
Leather tanning	Sodium bichromate	2,114,862	211,913	1,937,207	193,532
Glass manufacture	Chromite	12,000	432	90,000	2,754

NOTE.—In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. Chromite is also employed in Canada in the manufacture of refractories.

Table 164.—Chromite Mining in Canada, 1942, 1943 and 1944
(all in Province of Quebec)

		1942	1943	1944
Active firms	No.	14	15	7
Capital employed	\$	380,027	1,691,315	(*)
Employees—Salaried	No.	45	48	42
Wage-earners	No.	286	322	202
Total	No.	331	370	244
Salaries and wages—				
Salaries	\$	57,926	108,674	80,065
Wages	\$	354,529	460,610	293,529
Total	\$	412,455	569,284	373,594
Gross value of production	\$	343,568	919,878	748,494
Fuel and electricity used	\$	34,567	75,806	60,009
Process supplies used	\$	116,725	75,995	83,828
Freight	\$	17,945	37,969	45,373
Net value	\$	174,331	730,108	559,284

NOTE.—In addition, exploratory work, including diamond drilling, was conducted in 1942 on chromite deposits located in south-eastern Manitoba, but no data are available. Also, data shown in this table are included in tables 1 to 4.

(*) Data not recorded in 1944.

INDIUM

Indium was commercially recovered in Canada only in 1942 when 470 troy ounces valued at \$4,710 were produced at Trail, British Columbia by the Consolidated Mining and Smelting Company of Canada Limited. The metal was obtained in the treatment of zinc refinery residues. The United States produces a considerable quantity of indium but data relating to entire world production are not available. Indium is used for plating and as an alloy with other metals. The Bureau of Mines, Ottawa, reports that the augmented production of engine bearings and war restrictions on ordinary plating metals have stimulated interest in indium during the past three years. "E and M J Metal Markets", New York, August, 1944, quoted indium at \$7.50 per troy ounce 99.9 per cent pure.

IRON ORE

Deposits of iron ore in Canada are widespread and include hematite, siderite, magnetite, bog iron, and magnetic sand. Because of the availability at low cost of higher grade ores in the Lake Superior iron ranges of the United States and in Newfoundland, no iron ore from domestic sources was produced in Canada from 1923 until 1939.

Dominion Steel and Coal Corporation, Limited, Sydney, Nova Scotia, obtains its iron ore from its own mines at Wabana, Newfoundland. Steel Company of Canada, Limited, Hamilton, Ontario, and Canadian Furnace, Limited, Port Colborne, Ontario, obtain their iron ore from the Lake Superior region of the United States. Algoma Steel Corporation obtains most of its requirements from the United States, and the remainder from the New Helen mine, Michipicoten area, Ontario.

All but a small part of the iron ore produced in Canada in 1944 came from the New Helen mine of Algoma Ore Properties, Limited in the Michipicoten area, Ontario, and the remainder came from the hematite property of Steep Rock Iron Mines, Limited, near Atikokan, about 135 miles west of Port Arthur, Ontario. In 1943 a production of 125,000 tons of beneficiated magnetite was obtained from the Austin Brook mine near Bathurst, New Brunswick, but the property was idle in 1944.

Algoma Ore Properties, Limited (wholly owned subsidiary of Algoma Steel Corporation, Limited) began to develop the New Helen mine in 1937 and the first sinter was produced in July, 1939.

Large-scale tests on the treatment of ore from Algoma Properties' Goulais Iron Range, 50 miles northeast of Sault Ste. Marie, indicate that a product containing 65 per cent iron can be obtained, and further tests are being made. Based on the results of an extensive diamond-drilling program, the deposit is estimated to contain about 100,000,000 tons of siliceous magnetite. The active development of the Goulais Iron Range is not contemplated in the near future.

Directors of Steep Rock Iron Mines, Limited approved a three-year production program in the latter part of 1944 that calls for a total iron ore output of 5,000,000 tons from its hematite deposits in the Steep Rock Lake area, north of Atikokan, Ontario, during the shipping seasons of 1945 to 1947, inclusive. All mining is in the "B" ore-body, and open pit mining is planned to a maximum depth of 550 feet below bedrock. Exploratory work on the property in previous years had indicated that the deposits, which were discovered in the winter of 1937-38 under the bed of Steep Rock Lake by diamond drilling through the ice, are large. High-grade ore presumably makes up a considerable, but as yet very incompletely defined, part of them. The company reports that the property has 17,244,000 long tons of "proven ore" and 14,336,000 long tons of "probable ore", making a total of 31,580,000 long tons. Most of this ore is available for open pit mining. No estimate has been prepared of "possible ore".

Diversion of the Seine River was completed in 1943, and included about 20 miles of road building; the excavation of over 1,200,000 cubic yards of earth and of 500,000 cubic yards of rock; the lowering of Finlayson Lake by a tunnel; the construction of a spillway and control works in Raft Lake; the construction of coffer-dams to isolate the eastern part of Steep Rock

Lake; and the construction of a power line, the installation of pumps and barges, and works in preparation for pumping Steep Rock Lake. This pumping was commenced on December 10, 1943 and water was sufficiently down for the company to commence the production of iron ore by August, 1944. The first shipment from the Steep Rock mine left Atikokan on October 3, 1944 for delivery via Fort Frances to Superior, Wisconsin, for loading into Great Lakes boats. Difficulty was experienced, however, with viscous mud in the vicinity of the "B" ore-body which caused a curtailment of mining operations, but in the spring of 1945 the thickness of this mud had been reduced sufficiently by removal to overcome its tendency to flow over the site of the projected workings on the ore-body. Regular shipments to Lower Lake points via Duluth were commenced early in May, 1945. On June 22 advice was received to the effect that work on the ore docks at Port Arthur was by then sufficiently advanced to enable shipments of one of the three grades of ore through that port and that the docks would be ready for autumn use by September 1, 1945.

In 1944, the company erected a crusher and a screening plant capable of handling 700 tons an hour. In the screening plant the ore is separated into three sizes, namely 4 to 10-inch lump ore for open-hearth use; 1 to 4-inch charge ore for open-hearths use; and minus 1-inch blast furnace ore. The three sizes fall into separate sections of the bin below, where they are loaded into railway cars on the 3-mile spur (Canadian National railway) from Atikokan, and are hauled to the loading docks on the Great Lakes.

Michipicoten Iron Mines, Limited, which was formed in 1943 to take over the Josephine, Ruth, and Lucy iron properties, continued underground work in the Josephine mine throughout 1944. The three properties are owned jointly by Sherritt-Gordon Mines, Limited and Frobisher Exploration Company, Limited (Ventures, Limited), and are about 20 miles from Michipicoten Harbour, Algoma district, Ontario. In 1941, a transmission line was built to connect the Josephine mine with the power line at Hawk Junction, and the necessary electrically driven plant for development operations was installed. Shaft sinking was started in February, 1942, and was completed to a depth of 1,055 feet early in September of that year. Six stations were cut, the lowest being at the 1,015-foot level. While shaft sinking was in progress the ore-body was further explored by lateral diamond drilling at the first and second levels. The drainage of Parks Lake was then undertaken.

The underground work in the Josephine mine in 1944 was confined mainly to the three lowest (fourth, fifth, and sixth) levels, and most of its was on the fourth and sixth levels. The ore reserves were increased by 1,174,000 gross tons and now total 3,840,000 gross tons, averaging about 52 per cent iron, 15 per cent silica, 2.12 per cent sulphur, 0.04 per cent phosphorus, and 0.43 per cent manganese. Considerable headway was made toward equipping the Josephine mine for production on a scale of 375,000 gross tons of ore a year. This work involves the erection of a crushing plant, including a primary crusher underground, a concentrator for the production of open-hearth lump ore and a jig plant for the production of hematite concentrate. The plant was expected to be ready for operation by the end of April, 1945.

A contract for sale of the output from the Josephine mine has been made with Algoma Ore Properties, Limited (Algoma Steel Corporation). The contract is for a period of seven years from April, 1945 and it calls for the delivery of a minimum of 75,000 gross tons of open-hearth lump ore and 194,000 gross tons of hematite concentrate a year. The concentrate will be mixed and sintered with the siderite ore from the New Helen mine in Algoma Ore Properties sintering plant at Wawa, Ontario.

The Ruth property, which is 2 miles from the Josephine, remained idle in 1944. It was drilled extensively in 1942 and in the first three months of 1943, the indicated ore reserves to a depth of 800 feet being 28,600,000 long tons of siderite averaging 31.26 per cent iron, 13.15 per cent silica, and 5.14 per cent sulphur. These reserves include 16,840,000 tons of low-silica siderite averaging 34.54 per cent iron and 6.81 per cent silica. The remainder averages 26.57 per cent iron and 21.46 per cent silica.

On the Lucy property in the same area, a small amount of assessment work was done.

No further work was reported on the magnetite deposits in Hastings county, Ontario. Some exploratory work was done on a few of these deposits in 1941, 1942 and 1943.

At Sarpedon Lake in Quetico Park, Rainy River district, Sarpedon Iron Mines, Limited has been diamond drilling an iron formation in search of ore under the lake. Most of the exposed iron formation in the area is magnetite-bearing. It is hoped, however, that large concentrations of hematite will be found.

No work in 1944 was reported on the Gunflint iron range at Round Lake, southwest of Port Arthur, nor on the Matawin iron range south of Shebandowan. In 1943 Gunflint Iron Mines, Limited did some diamond drilling on hematite deposits on these ranges.

Since 1936, Labrador Mining and Exploration Company, the control of which was acquired in 1943 by Hollinger Consolidated Gold Mines, Limited, has been making extensive surveys and doing exploratory work on iron deposits near Sawyer Lake and vicinity, along the Quebec-Labrador boundary. Work on the Labrador side is being done by Labrador Mining and Exploration, and that on the Quebec side by Hollinger North Shore Exploration Company. To date, 24 iron deposits have been found, 15 in Quebec and 9 in Labrador. In addition, 3 outcrops have been reported in Labrador. The Sawyer Lake deposit is the only one on which much exploration has been done, but it is proposed to conduct an extensive diamond-drilling program on the various deposits when conditions become favourable.

The following tabulation gives an idea of the great possibilities of the region:

Name of Deposit Labrador	Per cent Fe + Mn	Apparent width Feet	Apparent length Feet
Sawyer Lake.....	68.4	150	2,200
Ruth Lake No. 1.....	57.9	100	3,300
Ruth Lake No. 2.....	59.3	175	300
Ruth Lake No. 3.....	61.7	400	1,230
Wishart Lake.....	61.6	100	2,400
Fleming Lake No. 1.....	67.9	40	750
Fleming Lake No. 4.....	59.6	3	600
Timmins Bay.....	69.4	40	1,000
Ruth Lake Extension.....	64.9	175	1,250

No details are available on the deposits in Quebec, though one deposit with a known width at some places of 350 feet and a known length of 3,900 feet has been disclosed. Outcrops to the south indicate the possible extension of this body for a distance of over 2 miles.

The Sawyer Lake area is about 325 miles from the St. Lawrence River at Seven Islands, which port is open to navigation throughout the year. Ample power will be available from the nearby Grand Falls on Hamilton River, where surveys have shown a potential minimum of 1,250,000 h.p. Hollinger has completed negotiations with M. A. Hanna Company of Cleveland, Ohio, for participation in the future exploration and development of the iron deposits both in Quebec and in Labrador.

Canadian production of iron ore in 1944 was 553,252 tons valued at \$1,909,608, compared with 641,294 tons valued at \$2,032,240 in 1943. Consumption of iron ore in 1944 totalled 3,478,800 short tons, of which 266,149 tons came from Canadian mines.

Exports of iron ore were 308,424 tons valued at \$1,153,166, compared with 374,677 tons valued at \$1,450,985 in 1943. Imports were 3,126,649 tons valued at \$7,393,926, compared with 3,906,425 tons valued at \$9,056,389 in 1943.

Shipments of sintered ore from the New Helen mine in 1944 amounted to 474,405 gross tons, and total shipments to the end of 1944 amounted to 2,328,900 gross tons. The ore was shipped via Michipicoten Harbour, 8 miles from the sintering plant, partly to the company's blast furnaces at Sault Ste. Marie, Ontario, and partly to United States ports on the Lower Lakes for use in United States blast furnaces. The manganese content is of special interest to users. The deposit is estimated by the company to contain at least 100,000,000 tons of

siderite or carbonate ore, averaging about 35 per cent iron. To fit it for commercial use in blast furnaces, a sintering plant capable of treating 3,000 tons of ore a day was built, the analysis of the sinter produced being approximately as follows:

	Per cent		Per cent
Iron.....	51.50	Alumina.....	2.35
Phosphorus.....	0.02	Lime.....	3.60
Silica.....	9.50	Magnesia.....	7.96
Manganese.....	3.00	Sulphur.....	0.04

It is expected that production from the property of Steep Rock Iron Mines, Limited will have an average grade (dry analysis) of:

	Per cent
Iron.....	60.48
Silica.....	3.40
Phosphorus.....	0.023
Sulphur.....	0.043
Loss by ignition.....	8.5

The moisture content is estimated to be 7 per cent. The natural iron content (averaging 56.54 per cent) is 4.54 per cent higher than the average of ore shipped from the Lake Superior ranges in the United States. The low silica content of 3.42 per cent will permit the use of the ore to "sweeten" other ores, and the extremely low phosphorus content of 0.017 per cent is well below the Bessemer limit. Though these qualities make Steep Rock ore a premium product, probably its most valuable quality is its physical structure, which should make it a good open-hearth lump ore, producing little minus 100-mesh fines and reducing the percentage of scrap normally required.

There are no official Canadian price quotations for iron ore. Prices, f.o.b. Lake Erie ports, a long ton for Lake Superior, U.S.A., iron ore, 51½ per cent iron ore are: Messabi, Non-Bessemer—\$4.45, Bessemer—\$4.60; Old Range, Non-Bessemer—\$4.60, Bessemer—\$4.75. The price of Brazilian ore, f.a.s. Brazilian ports, 68 per cent iron was 7¼ to 7½ cents a long ton unit.

Complete data on world production of iron ores have not been available since the commencement of the present world war. (Bureau of Mines, Ottawa.)

Table 165.—Production of Iron Ore(*) in Canada, 1939-1944

Year	Short tons	Value
		\$
1939.....	123,598	341,594
1940.....	414,603	1,211,305
1941.....	516,037	1,426,057
1942.....	545,306	1,517,077
1943.....	641,294	2,032,240
1944.....	553,252	1,909,608

(*) Exclusive of titanium-bearing iron ores. All from Ontario with the exception of 187 tons from Quebec in 1942 and 143,062 tons from New Brunswick in 1943.

Table 166.—Imports and Exports of Iron Ore, 1943 and 1944

	1943		1944	
	Short tons	\$	Short tons	\$
Imports.....	3,906,425	9,056,389	3,126,649	7,393,926
Exports.....	374,677	1,450,985	308,424	1,153,166

Table 167.—Shipments of Iron Ore from Wabana Mines, Newfoundland, 1931-1944

Year	To Nova Scotia	To United States	To Europe	Total Ship- ments
		(Short tons)		
1931.....	234,148	25,670	530,079	789,897
1932.....			166,303	166,303
1933.....			254,383	254,383
1934*.....	346,178		344,769	690,947
1935.....	611,581		81,123	692,704
1936.....	527,540	12,656	252,676	792,872
1937.....	702,714	50,490	1,242,088	1,995,292
1938.....	555,348		1,305,068	1,860,416
1939.....	576,198	16,184	980,098	1,572,480
1940.....	762,310	26,118	789,578	1,578,006
1941.....	943,643	63,869	316,530	1,324,042
1942.....	1735,324		234,483	969,807
1943.....	*903,414		2,688	906,102
1944.....	622,573		30,587	653,160

* Shipments to Europe in 1932 and 1934 were to Germany only, while from 1935 to 1938 shipments went to both Germany and Great Britain. Shipments to Germany in 1938 totalled 1,256,230 short tons, and in 1939, 768,743 tons. In 1940 and following years, European shipments went to Great Britain.

† Includes 41,203 tons lost by enemy action in 1942 and 5,969 in 1943.

Table 168.—Iron Ore Mining in Canada (a), 1942-1944

	1942	1943	1944
Active firms.....	7	14	8
Capital.....	2,508,650	7,570,964	(b)
Employees—On salary.....	42	99	99
Wage-earners.....	318	404	580
Total.....	360	503	679
Salaries and Wages—			
Salaries.....	\$ 93,484	205,857	242,271
Wages.....	\$ 582,635	1,229,098	1,220,182
Total.....	\$ 676,119	1,434,955	1,462,453
Gross value of production.....	\$ 1,517,077	2,032,240	1,909,608
Fuel and electricity used.....	\$ 301,778	363,354	642,761
Process supplies used.....	\$ 347,690	396,915	200,438
Freight and treatment charges.....	\$ 236,307	222,013	276,653
Net value.....	\$ 631,302	1,049,958	789,756

(a) Does not include data relating to titaniferous iron ores, also data in this table are included in tables 201, 202, 203.

(b) Data not recorded in 1944.

IRON AND STEEL AND THEIR PRODUCTS

The Primary Iron and Steel Industry

Table 169.—Provincial Distribution of Active Plants in the Primary Iron and Steel Industry, 1944

Province	Number of firms	Pig iron		Steel ingots and castings		Rolling and drawing mills	Ferro- alloys (a)
		Number of plants	Number of blast furnaces	Number of plants	Number of steel furnaces		
Nova Scotia.....	4	1	4	2	17	3	
Quebec.....	15			12	28	3	1
Ontario.....	16	3	10	11	72	10	3
Manitoba.....	3			3	5	1	
Alberta.....	2			2	3	1	
British Columbia.....	7			7	12		
Canada.....	(b) 47	4	14	37	137	18	4

(a) Not including artificial abrasive plants which made ferrosilicon as a by-product.

(b) Some firms operate in more than one province.

Table 170.—Principal Statistics of the Primary Iron and Steel Industry, 1944

Province	Number of plants	Average number of employees	Salaries and wages	Cost of fuel and electricity at works	Cost of materials at works	Gross selling value of products at works
			\$	\$	\$	\$
Nova Scotia.....	6	5,752	10,160,736	2,380,179	13,066,103	24,733,729
Quebec.....	17	6,137	11,950,859	2,781,518	10,422,778	32,959,912
Ontario.....	27	17,470	36,167,112	11,612,931	67,151,835	148,598,186
Manitoba.....	4	720	1,208,643	324,537	963,820	3,093,027
Alberta.....	3	253	428,334	65,729	359,070	1,237,837
British Columbia.....	7	431	921,347	111,530	251,260	1,886,990
Canada.....	64	30,763	60,837,031	17,276,424	92,214,866	212,509,681

NOTE.—Profits or losses cannot be calculated from above figures as data are not available for general expense items, such as interest, rent, depreciation, taxes, insurance, advertising, etc.

Table 171.—Production of Pig Iron and Sale by the Producers, 1943 and 1944

Grade	Delivered in molten condition	Machine cast	Total tonnage made	Sales	
				Quantity	Income from sales
	Net tons	Net tons	Net tons	Net tons	\$
1943					
Basic.....	1,338,913	117,636	1,456,549	84,575	1,697,774
Foundry.....		148,653	148,653	145,713	3,128,780
Malleable.....		153,067	153,067	156,821	3,501,768
Total.....	1,338,913	419,356	1,758,269	387,109	8,328,322
1944					
Basic.....	1,375,586	158,554	1,534,140	89,879	1,846,009
Foundry.....		143,763	143,763	143,498	3,091,233
Malleable.....		174,725	174,725	166,633	3,704,253
Total.....	1,375,586	477,042	1,852,628	400,010	8,641,495

NOTE.—Silvery pig iron has been included with ferro-alloys.

Table 172.—Materials Charged to Iron Blast Furnaces, 1943 and 1944

Material	1943		1944	
	Quantity	Cost at furnace	Quantity	Cost at furnace
	Net tons	\$	Net tons	\$
Iron ore—Imported (crude).....	2,955,671	12,247,784	2,468,082	10,351,514
Canadian (beneficiated).....	198,244	737,276	266,150	1,117,466
Foreign (beneficiated).....			758,957	3,293,806
Canadian (crude).....	104,536	460,160		
Mill cinder, roll scale, flue dust, etc.....	125,477	315,483	96,243	276,626
Scrap (net charge).....	43,032	543,930	27,604	283,290
Limestone—				
From Canadian quarries.....	464,497	867,146	233,621	330,795
From foreign sources.....	321,441	362,195	520,571	889,501
Dolomite.....	32,064	71,945	57,822	96,857
Coke.....	1,646,191	13,989,052	1,687,967	15,518,097
Other materials.....		315,061		235,688
Total.....		29,910,032		32,393,640

Table 173.—Imports Into Canada and Exports of Pig Iron, 1933-1944

Year	Imports		Exports	
	Net tons	\$	Net tons	\$
1933.....	2,754	43,298	13,331	214,195
1934.....	7,189	108,300	10,327	176,093
1935.....	9,990	143,726	15,410	287,396
1936.....	4,435	74,589	15,572	304,682
1937.....	7,135	144,354	43,138	851,701
1938.....	2,377	62,494	11,811	224,261
1939.....	657	15,176	12,015	221,787
1940.....	29,703	672,489	4,113	101,126
1941.....	4,729	131,112	380	10,090
1942.....	1,536	42,718	427	12,175
1943.....	7,118	173,598	438	11,163
1944.....				

Table 174.—Blast Furnaces in Canada, 1942-1944

Name of Company	Location of Plants	Number of stacks	Total daily capacity (24 hours)	Number of days in blast		
				1942	1943	1944
Dominion Steel and Coal Corporation, Ltd.	Sydney, N.S.		Net tons			
		1	616		180	329
		1	616	365	358	366
		1	392	365	16	128
		1	336	365	326	
Total.....		4	1,960			
Canadian Furnace Company, Limited.	Port Colborne, Ont.	1	466	304½	196½ (*)	313
		1	147	289	332	
Total.....		2	613			
The Steel Company of Canada, Limited.	Hamilton, Ont.	1	364	365	347	342
		1	728	365	365	366
		1	980	365	365	363
Total.....		3	2,072			
Algoma Steel Corporation, Ltd.	Sault Ste. Marie, Ont.	1	336	360	317	
		1	336	184	277	
		1	616	349	346	348
		1	504	361	346	218
		1	1,120		32	360
Total.....		5	2,912			
Total for Canada.....		14	7,557			

(*) For making pig iron; ferro-alloys also made in this furnace.

Table 175.—Production of Ferro-Alloys, 1933-1944

Year	Net tons	Year	Net tons
1933.....	33,749	1939.....	85,540
1934.....	35,751	1940.....	149,394
1935.....	63,410	1941.....	204,354
1936.....	85,438	1942.....	209,017
1937.....	91,921	1943.....	197,094
1938.....	62,637	1944.....	171,323

Table 176.—Production of Steel Ingots and Steel Castings, by Grades, 1939-1944 (Net tons)

Year	Steel ingots		Steel castings			Total steel ingots and castings
	Open hearth	Electric	Open hearth	Con-verter	Electric	
1939.....	1,410,339	79,718	17,473	934	42,590	1,551,054
1940.....	2,041,947	135,633	21,085	2,268	52,786	2,253,769
1941.....	2,394,098	199,414	29,401	3,371	85,887	2,712,151
1942.....	2,623,853	335,053	26,627	6,515	117,803	3,109,851
1943.....	2,484,544	362,192	28,895	4,003	124,490	3,004,124
1944.....	2,517,894	355,974	35,032	2,470	104,792	3,016,162

Table 177.—Materials Used in Steel Furnaces, 1943 and 1944

Material	1943		1944	
	Quantity	Cost of purchased materials	Quantity	Cost of purchased materials
	Net tons	\$	Net tons	\$
Pig iron—Own make	1,435,020		1,439,310	
Purchased	83,528	1,873,372	74,276	1,694,085
Scrap iron or steel—Own make	947,683		887,513	
Purchased	804,096	17,554,265	754,737	15,661,279
Spiegeleisen	367	31,474	1,708	85,728
Silicospiegeleisen			358	28,330
Ferromanganese	19,096	2,356,754	20,224	2,510,354
Silicomanganese	9,568	1,094,239	9,014	1,018,475
Ferrosilicon	11,545	767,911	11,055	692,370
High carbon	4,669	702,817	3,154	453,650
Low carbon	1,828	714,398	1,018	404,976
Ferromolybdenum		280,813	303	553,032
Ferrophosphorus	380	33,967	405	35,533
Ferroselenium	2	5,793	2	4,406
Ferrotitanium	614	118,416	786	149,527
Ferrotungsten	550	1,721,967	86	287,116
Ferrovandium	204	558,717	67	171,596
Ferrozirconium	8	2,153	15	1,613
Calcium silicon	515	166,023	241	76,374
Calcium manganese silicon	215	70,914	575	188,312
Other ferro-alloys		35,761		4,401
Aluminium ingot and shot	951	344,785	983	289,021
Copper ingots	37	8,467	95	20,451
Nickel	2,775	1,867,729	1,692	1,124,382
Other metals		141,285		79,024
Ore, iron, crude	107,619	671,079	154,217	1,203,977
Ore, iron, calcined, roasted or treated	62,052	668,843	198	1,004
Ore, manganese			25	592
Ore, chrome	1,369	63,838	1,204	56,831
Bentonite	3,853	97,975	3,745	88,527
Coal, anthracite	1,195	9,475	653	6,993
bituminous	133	1,264	6	236
Coke—Own make				
Purchased	5,158	60,770	4,685	51,659
Charcoal		7,457	199	8,034
Dolomite, Crude	78,746	243,793	77,085	199,774
Calcined	10,310	99,740	8,516	125,990
Fluorspar	20,790	715,991	20,024	692,104
Lime—Own make	29,776			
Purchased	36,080	344,488	63,721	450,533
Limestone—Canadian	125,058	242,328	86,216	148,050
Imported	116,974	136,371	150,951	241,183
Magnesite	19,427	744,716	18,665	740,450
Electrodes		1,075,799		952,084
Silica sand	95,605	703,167	89,807	646,841
Other foundry sand		154,707		73,740
Firebrick, fireclay and other refractories		2,634,711		2,358,681
Calcium molybdate and molybdenum oxide briquettes	522	813,861	561	517,456
All other materials		3,323,942		2,701,048
Total Value of Metals, Ores and Other Materials Used		43,257,235		36,800,822

Table 178.—Summary of Steel Furnace Capacity, December 31, 1944

	Number of furnaces	Total annual capacity
		(net tons)
Basic open hearth	51	2,825,400
Electric	83	786,000
Converter	3	8,000
Total	137	3,619,400
Steel ingots—Basic open hearth		2,813,400
Electric		492,500
Total		3,305,900
Steel castings		313,500
Total Ingots and Castings		3,619,400

LITHIUM

Amblygonite, spodumene, and lepidolite are the chief lithium minerals of commerce: their ores contain, respectively, about 8, 6, and 4 per cent of lithium oxide. Spodumene is in greatest supply, and is the base raw material for the manufacture of many lithium salts, lithium metal, and alloys. Amblygonite has similar uses, but is scarcer and more expensive. Lepidolite, or lithia mica, is employed mainly in the natural state as a batch ingredient in glass. The occurrence of all three minerals is confined to pegmatite dykes of a definite type, which usually have a localized, regional distribution and often carry, also, important amounts of beryl and tantalite-columbite. In some cases, such dykes have been worked for the recovery of all of these minerals.

There has been no recorded production of lithium minerals in Canada since 1937, when 32 tons of amblygonite and spodumene valued at about \$1,700 was shipped, and little if any lithium ore is known to be used or required for any purpose in the Dominion. Thus, an outside market would have to be found for any production. Considerable development work has been done in recent years, however, on deposits in the Pointe du Bois area in southeastern Manitoba; and in the three years ended 1944 increased interest was shown in the commercial possibilities of lithium deposits in other sections of that province, though activities have been confined to exploratory drilling. Some attention has been given, also, to lithium-bearing deposits in the Yellowknife-Beaulieu area in the Northwest Territories.

Lithium ores and compounds early became of strategic importance in the present war, and to conserve supply for defence needs the United States Government placed both under allocation control in 1942. Government assistance also was given to the establishment of two spodumene mills, one in North Carolina, and the other in South Dakota. These measures resulted in a considerable easing of the general supply situation in 1944.

All of the small Canadian production of lithium minerals has come from the Pointe du Bois area in Manitoba. Lithium Corporation of Canada, 409 Avenue Building, Winnipeg, is the company that has been most actively interested in furthering the development of the lithium-bearing pegmatites in the area, and it has carried out considerable work on its holdings, mainly on those at Bernie Lake. It mined and stock-piled about 50 tons of mixed ore in 1941, but was inactive during 1942-1944. The material taken out in 1941 comprised about equal amounts of cobbled amblygonite and spodumene, and included also a few tons of triphylite, a phosphate of lithium and iron, containing, theoretically, about 9 per cent of lithium oxide.

Lithium is the lightest of the metals, having a specific gravity of only 0.53. A wide range of master alloys of lithium with calcium, silicon, brass, copper, manganese, zinc, lead, tin, magnesium, and aluminium has been developed in the United States. The alloys are being used to an increasing extent as deoxidizing, degasifying, and desulphurizing agents in copper, brasses, bronzes, etc.; as scavengers for cast iron and in the refining of high-carbon steel; and for the hardening of lead and aluminium. Alloys of lithium with zinc, aluminium, and magnesium are strong and highly resistant to corrosion.

Prices of lithium minerals in 1944 showed little change from those of the previous year. Amblygonite, 8 to 9 per cent Li_2O , was quoted at \$40 to \$50 per ton; spodumene, 6 per cent grade, at \$5 to \$6 per unit for mill concentrates; and lepidolite, 3 per cent Li_2O at \$25 per ton, all f.o.b. mines. Lithium metal was unchanged at \$15 per pound.

There are no plants in Canada for the chemical treatment of lithium ores. Most of the world production marketed prior to the war was treated by a few large chemical firms specializing in the business, the principal plants being in the United States, Great Britain, Germany, and France. Such firms usually purchased their requirements under individual contract, and there has thus been little in the way of an open market, price quotations given in trade journals being merely nominal. Some of the larger consumers own and operate their own mines.

MAGNESIUM

Magnesium, industry's lightest metal, is available from many sources in Canada and elsewhere. The present source of the metal produced in Canada is dolomite. Other potential sources are magnesite, brucite, serpentine, and sea-water.

Dolomite, the double carbonate of calcium and magnesium, and which contains 13 per cent of magnesium, is found in all provinces of Canada except Prince Edward Island. It is particularly abundant in Ontario and Manitoba.

Magnesite, the carbonate of magnesium, containing 28.7 per cent magnesium, and hydromagnesite, containing 26.5 per cent of magnesium, are available in British Columbia. Deposits of magnesitic dolomite consisting of an intimate mixture of magnesite and dolomite occur in Argenteuil county, Quebec, where they are being worked for the production of basic refractories. The magnesite deposits in British Columbia are undeveloped, but magnesium has been made from them on an experimental scale. Magnesitic dolomite possesses no advantages over dolomite or magnesite as a source of magnesium.

Brucite, in the form of granules 1 to 4 mm. in diameter thickly disseminated throughout crystalline limestone and forming 20 to 35 per cent of the volume of the rock, occurs in large deposits in Ontario and Quebec. Brucite is the hydroxide of magnesium and contains 41.6 per cent of magnesium. The Canadian deposits are the largest known in the world. The brucite is being recovered in the form of granules of magnesia from one of these deposits near Wakefield, Quebec, and though the granular magnesia so obtained is being used principally for the manufacture of basic refractories and as an ingredient in chemical fertilizers, it is a very suitable raw material for the production of magnesium metal.

Serpentine, the silicate of magnesium, contains 25.8 per cent of magnesium, and occurs in many deposits throughout Canada. It is also available in huge waste dumps aggregating probably 100,000,000 tons in the asbestos-producing region of Quebec. The average magnesium content of these dumps is about 23 per cent. A process has been worked out for the recovery of magnesium from serpentine.

Sea-water, although it contains only 0.13 per cent magnesium, is a source of the metal in England and the United States. Dolomitic lime is used to precipitate the magnesia from the sea-water in the form of hydroxide, and the magnesia from both is recovered in the process.

Underground brines containing $MgCl_2$ and residual brines from salt-making operations, containing $MgCl_2$, are used in the United States as sources of magnesia and magnesium, but brines containing sufficient $MgCl_2$ to render them of value are not available in Canada.

Processes for the production of the metal from the various raw materials may be divided into two groups, namely, electrolytic, and thermal. The electrolytic process provides most of the magnesium made, except in Canada where a thermal reduction process is used. The three thermal reduction processes in use throughout the world involve reduction of magnesia with carbon (in use in the United States); reduction of magnesia with calcium carbide (in use in the United Kingdom); and reduction of calcined dolomite with ferrosilicon (in use in Canada, the United States, and Italy).

The ferrosilicon reduction process in use in Canada involves the grinding and mixing together of ferrosilicon, calcined dolomite, and a catalyst, briquetting the mixture, and charging the briquettes to externally heated retorts operating under a vacuum. The magnesium vapour is condensed on the sides of a water-cooled condenser and is removed as a ring or crown of pure solid metal. These crowns are re-melted and cast into ingots, with or without alloying elements.

Dominion Magnesium, Limited, Haleys, Ontario, which began production in August, 1942, is the only producer of magnesium in Canada. The plant is operated by a private company under supervision of Wartime Metals Corporation, a Crown company. Production in 1944 amounted to 5,290 tons valued at \$2,575,695, compared with 3,577 tons valued at \$2,074,652 in 1943.

No data are available for publication on exports and imports of magnesium, but most of the production is exported.

The three magnesium foundries in Canada are located at Toronto, Montreal and at Renfrew, Ontario. They are operated respectively by Aluminum Company of Canada, Limited, Robert Mitchell Company, Limited, and Light Alloys, Limited. A plant for the making of magnesium powder is operated at Trail, British Columbia, by Consolidated Mining and Smelting Company of Canada, Limited.

The field of usefulness of magnesium is steadily expanding. Magnesium was formerly used almost exclusively in pyrotechnics, but it is used also as a structural metal, particularly in the form of castings and extruded shapes. For structural use it is alloyed with various portions of other elements. It is used as a constituent in many aluminium-base alloys.

The price quoted by Engineering and Mining Journal for magnesium in ingot form in carload lots during 1944 was 20½ cents per pound, U.S. currency, f.o.b. New York.

Complete data on world production of magnesium are not available. Production of primary magnesium ingot in the United States in 1944 totalled 168,337 short tons; in Great Britain the production of ingot in 1943 totalled 25,800 short tons. (Bureau of Mines, Ottawa.)

Table 179.—Production of Primary Magnesium Metal in Canada, 1916-1918 and 1941-1944

Year	Quebec		Ontario		British Columbia		Canada	
	Pounds	\$	Pounds	\$	Pounds	\$	Pounds	\$
1916-1918.....	(a)	(a)	.....	.....	(b) 200,000	(b)	.....	.....
1941.....	.....	.....	.....	.....	(c) 10,905	2,944	10,905	2,944
1942.....	(d) 141,081	62,076	473,910	208,520	193,727	85,240	808,718	355,836
1943.....	.....	.....	7,153,974	2,074,652	.....	.....	7,153,974	2,074,652
1944.....	.....	.....	10,579,778	2,575,695	.....	.....	10,579,778	2,575,695

(a) Magnesium metal produced in 1918 at Shawinigan Falls, Quebec by Shawinigan Electro Metals Company Limited from imported magnesium chloride but data not available.

(b) Approximately 200,000 pounds produced at Trail from imported magnesium chloride; complete data not available.

(c) Powder.

(d) Produced in Ontario from Quebec brucite.

Table 180.—Consumption of Magnesium Ingots in Canada, 1940-1944

	1940	1941	1942	1943	1944
	(pounds)				
In non-ferrous smelters.....	192,000	825,717	1,072,346	1,298,650	1,480,528
In white metal alloy foundries.....	7,770	9,515	9,850	16,821	55,496
In brass and bronze foundries.....	163	42,821	44,553	132,465	51,040
In aluminum products.....	240	127	.....	89,523	34,430
In ammunition.....	404	.....	.....	.....	.....
Total accounted for.....	200,577	878,180	1,126,749	1,537,459	1,621,494

MANGANESE

All manganese properties in Canada were inactive in 1944. The small Canadian production in the past has come from deposits in the Maritime Provinces.

The manganese ores that have been mined in Canada are pyrolusite (MnO_2), psilomelane (H_4MnO_6), manganite ($\text{Mn}_2\text{O}_3\cdot\text{H}_2\text{O}$), and braunite (Mn_2O_3), all of which are black or grey-black and comparatively hard; bog manganese, a soft earthy black oxide; and a small amount of rhodochrosite (MnCO_3), a pink, fairly soft mineral. Pyrolusite, the most common and most important, contains, when pure, 63 per cent manganese. It is much softer than the other hard rock ores and can be distinguished in the field by the ease with which it blackens the fingers. Most of the hard rock deposits are replacements in limestone, but they also occur in the form of accumulated nodules and cementing material in siliceous sediments, and as veins in metamorphosed precarboniferous rocks.

Most of the 200 deposits of manganese known in Canada are in the Maritime Provinces. They are mostly low-grade replacement or bog deposits, and a small amount of high quality ore has been mined in only a few localities.

Since the outbreak of the war much attention has been given to the development of known deposits, to the search for new sources of supply, and to the exploration of several old properties. Little high-grade ore remains in these old properties, though it is possible that a fair tonnage of medium-grade ore is available. No new deposits have been found, however, and attempts to operate some of the better grade old properties were discontinued after a few months' work. Production ceased in the fall of 1943, in which year a carlot was shipped from Jordan Mountain, north of Sussex, New Brunswick. From 1939 until the fall of 1943 there was a small production in New Brunswick also from Gowland Mountain near Elgin, southeast of Sussex; Turtle Creek, near Berryton, and at Quaco Head, near St. Martin on the south coast.

In Nova Scotia, the principal output came from New Ross, 45 miles west of Halifax, and there was a small output from East Mountain, east of Truro.

From 1886 to the end of 1943, a total of about 18,600 short tons of manganese ore was produced in Canada, close to half of it from 1887 to 1890 inclusive.

Approximately 45 per cent of the imports of manganese ore in 1944 totalling 79,906 short tons, valued at \$2,213,396, came from India; about 40 per cent from the Gold Coast; and the remainder from Egypt, Chile, and the United States. This was an increase of 56 per cent over the tonnage imported in 1943. Consumption was 81,824 tons, a 36 per cent increase over that of 1943.

World production of manganese ore is between six and seven million tons annually, the leading producing countries being Russia, British India, Gold Coast, United States, Union of South Africa, Brazil, and Cuba.

It is estimated that over 90 per cent of the world consumption of manganese ore is used in the manufacture of iron and steel, the ore so used being termed "Metallurgical". The remainder is termed "Chemical". Metallurgical ore is used for making ferromanganese, silico-manganese, and spiegeleisen, in which forms it is added to the steel bath. Manganese is beneficial mainly in improving the workability of the steel and in improving the product by acting as a deoxidizer, a desulphurizer, and a re-carbonizer. About 13 pounds of manganese is used in each ton of steel. Ferromanganese, containing 75 to 82 per cent manganese and 5 to 7 per cent carbon, is by far the most important addition agent, and the highest "ferro" grade ore is used to make it. Such ore should contain at least 48 per cent of manganese and not more than 6 per cent iron, 10 per cent silica and alumina, and 0.18 per cent phosphorous; and the ratio of manganese to iron should not be less than seven to one. The ore should be hard and in lumps of less than 4 inches, and not more than 12 per cent should pass a 20-mesh screen. Soft ores, such as bog manganese, are objectionable unless they are briquetted. It takes about two tons of 48 per cent ore to make one ton of standard ferro.

The Canadian market for metallurgical ore is confined mainly to two manufacturers of manganese ferro-alloys; namely, Electro-Metallurgical Company, Welland, and Canadian Furnace, Limited, Port Colborne, both in Ontario.

Chemical grade ores are used mainly in the manufacture of dry batteries. Specifications call for high-grade pyrolusite because of its high available oxygen, which acts as a depolarizer. The ore should contain not less than 75 per cent manganese dioxide (MnO_2). Most of the ore is ground to 200 mesh, but some coarse ground ore of 8 to 12 mesh is also used. Canadian requirements of chemical ore range from 3,000 to 4,000 tons a year, most of it being ore from the Gold Coast. Nearly all of it is used by three manufacturers of dry batteries in Ontario, namely: Canadian National Carbon Company, Toronto; Burgess Battery Company, Niagara Falls; and General Dry Batteries of Canada, Limited, Toronto. Chemical ore is used also as a colouring agent in the glass, ceramic, and paint industries; as pigments and dyeing materials; as salts in photography, fertilizers, disinfectants, bleachers; and for other minor purposes.

Prices of ferro-grade ore depend upon the manganese content and the amount of harmful impurities. Imported ore is usually quoted in cents per long ton unit of 22.4 pounds of contained manganese. United States prices for metallurgical ores (based on a standard duty-free ore containing 48 per cent manganese and within the specifications outlined), are 85 cents per long ton unit of contained manganese at Gulf of Mexico ports, and 90 cents at New York and other Atlantic ports. The premiums and penalties for ores varying from the standard grade were obtained from the Metals Controller, Ottawa. The prices paid in 1944 by the Government and Canadian consumers for approximately 48 per cent manganese ore were \$46 for Indian ore at Welland and \$37 per long ton for Gold Coast ore at Canadian ports.

The delivered prices of chemical grade (battery grade) manganese ores in Canadian currency for finely ground battery grade ore in bags imported into Canada from Africa or Montana, U.S.A., was \$60 to \$85 a short ton depending upon mesh and origin.

Known deposits of high-grade manganese ore in Canada are small, and are almost exhausted. No commercial grade deposits have been found and future production appears to be unlikely unless sufficient manganese is discovered during the operation of the Steep Rock iron deposits to warrant its recovery as a by-product. (Bureau of Mines, Ottawa.)

Table 181.—Production (Sales) of Manganese Ore in Canada for Years Specified

Year	Tons	Value	Year	Tons	Value
		\$			\$
1915.....	201	9,360	1936.....	221	1,596
1916.....	957	89,544	1937.....	85	817
1917.....	158	14,836	1938.....		
1918.....	440	6,230	1939.....	396	3,688
1924.....	554	4,088	1940.....	152	4,315
1925-1929.....			1941.....	(*)	(*)
1930.....	273	1,356	1942.....	435	8,932
1931.....	117	2,893	1943.....	48	985
1932-1934.....			1944.....		
1935.....	100	800			

(*) 7,500 pounds manganese metal produced at the mine from Nova Scotia manganese ore.

Table 182.—Consumption of Manganiferous Ore and Manganese Compounds in Specified Canadian Industries, 1943 and 1944

Industry	Items	Quantity	Value
			\$
1943			
Electrical apparatus and supplies.....	Manganese dioxide..... pound	6,105,401	215,613
Paints, pigments and varnishes.....	Manganese naphthenate..... pound	70,271	12,880
Steel ingots and castings.....	Ore, manganiferous (foreign)..... pound		
	Spiegeleisen..... short ton	367	31,474
	Ferromanganese..... short ton	19,096	2,356,754
	Silicomanganese..... short ton	9,568	1,094,239
White metal alloys.....	Manganese metal..... pound	9,431	4,704
1944			
Electrical apparatus and supplies.....	Manganese dioxide..... pound	6,627,920	236,404
Paints, pigments and varnishes.....	Manganese naphthenate..... pound	67,059	14,604
Steel ingots and castings.....	Ore, manganiferous (foreign)..... pound	50,000	592
	Spiegeleisen..... short ton	1,708	85,728
	Ferromanganese..... short ton	20,224	2,510,354
	Silicomanganese..... short ton	9,014	1,018,475
White metal alloys.....	Manganese metal..... pound	4,717	1,333

NOTE.—In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

MERCURY

At the outbreak of the war the Allies were seriously deficient in mercury, as the bulk of world output came from Italy and Spain. Prices rose to nearly three times the pre-war level but within two years, owing to the greatly increased production from the United States and from the Pinchi mine in British Columbia, supplies became sufficient to enable the export of mercury to the other Allied countries. Early in 1944 many of the activities in the United States and some in Canada were suspended as the supply was much greater than the demand, and prices declined. The Pinchi mine was closed down in July and at present (April, 1945) no mercury is being produced in Canada. Late in the summer, however, a complete reversal took place, mainly due to unforeseen requirements for a new application, and prices increased appreciably. Towards the close of the year, stocks in the United States were at their lowest level and some of the mines in that country were reopened.

Cinnabar (HgS), the principal ore of mercury, is a heavy (s.g. = 8.1) mineral with a deep cochineal-red colour and scarlet streak, and contains 86 per cent mercury. In Canada, the ore occurs in porous rocks such as altered limestones (ankerite), volcanic breccias or greenstones, and green and purple andesitic lavas. The cinnabar often occurs in veins and stringers of calcite or dolomite within these rocks and may be associated with stibnite (antimony sulphide) and accompanied by globules of metallic mercury. The presence of mercury can be readily detected by heating a small piece of rock to about 300°C and placing it between an ultra-violet ray lamp with purple filter and a screen coated with powdered willemite (zinc silicate). If mercury is present a fume shadow will be cast on the screen. As little as 0.02 per cent mercury can be detected in this manner, but better results are achieved with a powdered sample.

The only known deposits of cinnabar in Canada are in British Columbia, by far the most important development being that on the northwest side of Pinchi Lake, Omineca mining division, about 40 miles north of Vanderhoof station on the Canadian National Railway. The ore-bodies are on a steep mountainside and consist of large cinnabar-bearing areas in veins and as impregnations, mainly in dolomitized and brecciated limestone along zones of fracturing and shearing. The deposit was discovered in the summer of 1937 and was optioned late in 1938 to Consolidated Mining and Smelting Company. Production was started in June, 1940. The mine has been developed by a glory hole and by levels for 400 feet above the main 200-foot haulage level from which a 200-foot deep shaft was sunk early in 1944, giving a vertical distance of about 800 feet. Exploration and diamond drilling revealed ore all the way down to the bottom of the shaft, and at this depth the grade is better than the average (0.4 per cent mercury) of the milling ore. A number of cinnabar claims were staked and prospected in 1942 and 1943 along the so-called "Pinchi fault", which runs in a northwesterly direction for at least 100 miles from Pinchi Lake. Of chief importance is the Takla property, east of the headwater of Silver Creek, 85 miles northwest of the Pinchi mine.

During the period 1939 to 1943 some prospecting was also carried out and a few flasks were produced from deposits north of Kamloops Lake; from the Yalakom River, 30 miles northwest of Lillooet; from Relay Creek and 16 miles north of Minto City, both north of Bridge River. Part of the Empire Mercury Mines plant, north of Minto City, was removed to Copper Creek, Kamloops Lake, in the autumn of 1942, but apparently was not re-erected.

Canadian production in 1944 was 9,683 flasks (of 76 pounds each) valued at \$1,210,375, as compared with 22,240 flasks valued at \$4,559,200 in 1943. Since the outbreak of the war Canada has produced 54,641 flasks or about 2,076 tons.

Exports amounted to 4,682 flasks, a decrease of 70 per cent compared with 1943. They were valued at \$959,810 and were shipped to India, United States, and Australia. Imports were 466 flasks valued at \$44,182, and were nearly all from Mexico. Producers and consumers stocks at the end of the year were 8,315 flasks.

The plant at the Pinchi mine, consisting of Wedge roasters, kilns, and condensers, is capable of treating about 1,200 tons of ore daily, but was treating only 400 tons daily before it was closed down in July because of the lack of a market and of an accumulation of stocks. The Pinchi mine was the largest single producer of mercury in the Western hemisphere, its output during its four years of operation being over 2,000 tons of refined mercury.

The Takla property was operated by Bralorne Mines, Limited, and production from the 100-ton plant was started in November, 1943. As the deposit is in comparatively flat country the mine is developed by shaft, mainly from the 100-foot level. Operations ceased in September, 1944, after the Metal Reserve Company (U.S.) cancelled the contract. Production during the period amounted to about 66 tons of mercury.

World production just prior to the war was estimated to be slightly in excess of 5,500 metric tons a year. For many years Italy and Spain have shared honours as the leading producer, and prior to the war they accounted jointly for 75 per cent of the world output, and the United States contributed about 11 per cent. The pre-war output from Russia, then the fourth largest producer, was about 300 metric tons a year. Production from Mexico in 1944 was reported to be about 900 tons. Czechoslovakia, China, Japan, Chile, and Peru are also producers of mercury. In the Union of South Africa, production was started at Monarch Kop in 1940 and its output has increased substantially each year since then. In 1944 it was nearly 1,200 flasks (45.3 tons).

Production in the United States in 1944 was about 37,500 flasks, compared with 51,929 in 1943, which was the highest since 1881. California contributed about 75 per cent of the output. The New Idria mine in San Benito county, California, continued to be the leading producing mine.

Canada uses about 3,000 flasks of mercury a year, about 75 per cent of it for medicinal and pharmaceutical purposes, and in heavy chemical industries. The consumption of mercury in Canadian gold mines, which is now about 7 per cent of the total, has decreased owing to wider use of cyanidation and to improvements in the recovery of the mercury after amalgamation.

In the United States the main cause for the recent marked increase in consumption was the large demand for mercury for use in the Ruben dry battery. This small cell, about $\frac{3}{8}$ -inch high, containing mercuric oxide and layers of zinc and paper in the form of a spiral, will last five times as long as the standard flash lamp battery. It is being used widely in all branches of the armed forces; in small portable radios (walkie-talkie), etc.; and large peacetime markets are forecast. Other uses for mercury are: as a catalyst or in the electrolytic preparation of chlorine, caustic soda, acetic acid, and acetone. In the past an appreciable amount of the metal was consumed as fulminate of mercury, a powerful detonator, but this has been replaced by other compounds such as lead azide, and only a small quantity of mercury is now used for a special type of detonator. Mercury is used in the manufacture of mercury salts, thermometers, medical supplies, mirrors, mercury vapour, and fluorescent lamps; in the manufacture of electrical and chemical apparatus; for automatic electrical contacts; in electric rectifiers; as cathodes in electrolytic chemical processes; in the manufacture of felt; in boiler compounds; in especially designed mercury boilers to replace steam in power production; in cosmetics; and for anti-fouling paint.

In the first quarter of 1944 the controlled United States price of mercury was \$176 per flask, but by July the price had dropped to \$96. It rose to \$140 in December and to \$170 in February, 1945. In 1938 the average price was \$75.

Imports of mercury into Canada from the United States are not subject to duty, but are subject to a sales and war tax amounting to 18 per cent of the value in Canadian funds. The present price of Canadian mercury is largely governed by that of the United States. Canadian imports into the United States are subject to a tariff of 25 cents per pound, or \$19 per flask in United States currency. Specifications call for a minimum of 99.5 per cent mercury and a maxima of 0.3 per cent antimony and 0.1 per cent arsenic.

Apart from direct war uses, it is possible that the demand for mercury will continue to rise, due to its new use in the manufacture of miniature dry batteries. In the event of an increased demand for this and other uses, Canada's output could be readily maintained at the record rate of 1943, when 22,240 flasks were produced, and, if necessary, this rate could be substantially increased. (Bureau of Mines, Ottawa.)

Table 183.—Production of Mercury in Canada

Year	Pounds	\$	Year	Pounds	\$
1895.....	5,396	2,343	1940.....	153,830	369,317
1896.....	4,408	1,940	1941.....	536,304	1,335,697
1897.....	684	324	1942.....	1,035,914	2,943,807
1924-1927 (*).....	380	(*)	1943.....	1,690,240	4,559,200
1938.....	760	760	1944.....	735,908	1,210,375
1939.....	436	1,226			

(*) Data from a report issued by Bureau of Mines, Ottawa; value not recorded.

Table 184.—Consumption of Mercury in Specified Canadian Industries, 1940-1944

	1940	1941	1942	1943	1944
	(Pounds)				
Medicinals and pharmaceuticals.....	30,246	67,607	78,362	79,786	24,307
Heavy chemicals (catalyst).....	30,904	35,319	50,968	72,531	78,300
Electrical apparatus.....	1,899	25,738	42,313	28,786	5,840
Non-ferrous smelters.....	1,636	4,635	1,201	1,838	2,022
Petroleum refineries.....	328	920	684	372	.....
Gold mines.....	6,000	11,091	10,000	10,000	10,000
Ammunition.....	4,630	8,217	.....	.....	49
Other industries.....	.....	2,591	1,650	5,752	7,000
Total accounted for.....	75,643	156,118	185,178	199,065	127,518

MOLYBDENITE

Molybdenum concentrates produced in Canada are shipped to Climax Molybdenum Company, Langeloth, Pennsylvania, for conversion into oxide or ferromolybdenum, and equivalent amounts of these products are shipped by that company to Railway and Power Company, Montreal, the distributor for Canada. The supply situation had improved to such an extent that in April, 1944, it was decided to discontinue operations at the Indian Molybdenum mine (Dome Mines, Limited) in Preissac township, Quebec, as the output from the LaCorne mine in LaCorne township, Quebec, would be sufficient to meet the Canadian requirements. In May, 1944, operations at the Quyon Molybdenite property near Quyon, Quebec, were also discontinued.

Molybdenite, the chief ore of molybdenum, is a soft and shiny steel blue-grey sulphide containing 60 per cent of the metal. In Eastern Canada it is usually found in pegmatite dykes or along the contacts of limestone and gneiss, commonly associated with greenish grey pyroxenites in which other metallic minerals such as pyrite and pyrrhotite often occur. In northern and western Ontario, Quebec, and in British Columbia, molybdenite usually occurs in quartz or in quartz veins, along the contacts of, or intruded into granites, or diorites. It generally occurs in the form of soft, pliable flakes or leaves, but is sometimes semiamorphous, filling cracks and smearing the rock surface. It can be readily distinguished in the field by the olive grey-green smear it leaves when rubbed on glazed white porcelain or enamel. Graphite, for which it is often mistaken, leaves a grey-black smear.

All of the production in 1944 came from the LaCorne and Indian Molybdenum mines in the Abitibi area and the Quyon Molybdenite mine near Quyon, Quebec, 35 miles northwest of Ottawa.

From the 187,130 tons of ore treated in 1944 by the three producers, about 1,097 tons of high-grade concentrate was produced and 1,064 tons of concentrate and molybdenum trioxide were shipped, the 561 tons of contained molybdenum being valued at \$1,079,698. In 1943, 192 tons of contained molybdenum was shipped.

War-time Metals Corporation took over the LaCorne property in July, 1942, and made arrangements for Siscoe Gold Mines, Limited, to operate the mine. Production at the enlarged mill was started in May, 1943, and by the end of December, 1944, nearly 150,000 tons of ore

containing between 0.6 and 0.7 per cent MoS_2 had been treated, the average during 1944 being about 270 tons daily. The mine is producing over 30 tons of molybdenum (contained in high-grade concentrates) a month.

Indian Molybdenum's 600-ton mill entered production in September, 1943, and by April 30, 1944, when it was closed, it had treated a total of about 93,000 tons of ore.

Quyon Molybdenite Company treated about 150 tons of ore daily, which averaged 0.2 per cent MoS_2 . The concentrate was converted to molybdix oxide in a small roasting plant on the property, and was then briquetted and shipped to steel manufacturers in Canada. During the last war this mine was the world's largest producer of molybdenum and it contributed nearly 80 per cent of Canada's output before 1939. The company was acquired by J. J. Gray, of Toronto, in May, 1944.

Prior to the war, 91 per cent of the world production, estimated at 16,500 tons of metallic molybdenum, came from the United States. Climax Molybdenum Company, Climax, Colorado, the world's largest producer, reduced its tonnage and is treating about 10,000 tons of ore daily containing about 0.5 per cent MoS_2 . The company probably contributed about 60 per cent of United States total output of contained molybdenum in 1944. This total amounted to 19,267 tons, compared with 30,833 tons in 1943. Most of the remainder is obtained as a by-product of some of the large copper producers in Utah, New Mexico, and Arizona. Other producing countries are Norway, Mexico, Chile, Peru, French Morocco, Korea, Greece, Turkey, Yugoslavia, Australia, and recently Manchuria.

Molybdenite concentrate is converted into an addition agent that is introduced into steel as molybdenum trioxide, ferromolybdenum, or to a small extent as calcium molybdate. The oxide is usually moulded into briquettes.

Molybdenum has a widening range of uses, but by far the greater part of the output is used in steel to intensify the effect of other alloying metals, particularly nickel, chromium, and vanadium. These steels usually contain from 0.15 to 0.4 per cent molybdenum, but in some instances the percentage is considerably higher.

The Metals Controller's contract to purchase all domestic molybdenum products at a bonus price of not less than 85 cents a pound of contained sulphide in concentrate, f.o.b. Ottawa, was terminated on December 31, 1943, owing to changed conditions. New producers will have to sell in the open market at the normal price which is about 50 cents (Canadian funds).

The price a pound of contained molybdenum, f.o.b. Toronto, in Canadian funds, for the following imported compounds is approximately: Calcium molybdate (42 per cent Mo), 98 cents; ferromolybdenum (60 per cent Mo), \$1.15; and molybdic oxide (52 per cent Mo), 98 cents. The calcium molybdate is sold in bags of about $12\frac{1}{2}$ pounds containing exactly 5 pounds of molybdenum. The molybdic oxide briquettes weigh 5 pounds each and contain $2\frac{1}{2}$ pounds of molybdenum.

Canadian ore and concentrate shipped to the United States is subject to a duty of $17\frac{1}{2}$ cents a pound of contained molybdenum.

Imports of calcium molybdate into Canada during 1944 totalled 3,960 pounds valued at \$3,596. In 1944 the quantity of calcium molybdate and molybdenum oxide used in Canadian steel furnaces totalled 522 short tons valued at \$813,861. (Bureau of Mines, Ottawa)

Table 185.—Production of Molybdenite in Canada, 1902-1944

Year	Ores milled	Ores and concentrates shipped or used		Total MoS ₂ content of shipments
	Tons	Tons	Value (a)	Pounds
			\$	
1902.....	(c) 3	3.3	400	(b)
1903.....	(c) 600	85.0	1,275	(b)
1904-1913.....				
1914.....	(c) 166	16.5	2,063	3,814
1915.....	216	39.0	28,920	29,210
1916.....	9,100	610.0	188,316	156,461
1917.....	22,605	1,554.3	320,006	330,316
1918.....	33,935	461.3	428,807	378,482
1919.....	6,783	46.0	69,203	83,002
1920-1923.....				
1924.....	668	10.0	9,370	18,739
1925.....	2,779	15.3	11,176	22,350
1926.....	4,490	12.6	10,472	20,943
1927.....				
1928.....				
1929.....	2,900	9.5	6,400	16,150
1930.....				
1931.....	12	0.61	280	1,222
1932-1936.....				
1937.....	5,307	8.25	8,147	(b)
1938.....	(b)	6.5	4,500	(b)
1939.....	1,492	1.3	816	(b)
1940.....	3,936	11.1	10,280	(b)
1941.....	28,100	98.3	88,470	173,991
1942.....	39,708	113.7	134,963	158,780
1943.....	120,576	392.4	549,515	653,200
1944.....	187,130	1064.0	1,079,698	1,870,132

(a) Value as given by the operators 1902 to 1939; 1940-1943 value estimated using market or Government prices.

(b) Not known.

(c) Mined.

Table 186.—Molybdenite Mining in Canada, 1942, 1943 and 1944

	1942	1943	1944 (a)
Active firms.....No.	16	12	4
Capital.....\$	237,044	3,672,813	(*)
Employees—On salary.....No.	43	38	31
Wage-earners.....No.	127	221	148
Total.....No.	170	259	179
Salaries and wages—Salaries.....\$	29,482	82,319	62,954
Wages.....\$	190,249	394,952	332,512
Total.....\$	219,731	477,271	395,466
Gross value of production.....\$	134,963	549,515	1,079,698
Fuel and electricity used.....\$	30,965	73,961	54,614
Process supplies used.....\$	21,124	81,072	103,774
Freight and treatment charges.....\$	34,243	3,249	72,681
Net value of production.....\$	48,631	391,219	848,629

(*) Data not recorded in 1944.

(a) Data included in last tables in chapter 5.

PITCHBLEND

Pitchblende, the ore from which radium and uranium products are made, is mined in Canada only in the Great Bear district of the Northwest Territories.

Most of the world production of radium and uranium ores has come from the Belgian Congo, Canada, and the United States. The American material consists mainly of low-uranium carnotite, found mainly in Colorado and Utah, and now mined chiefly for its vanadium content, the present recovery of uranium and radium being small. Ores of the Belgian Congo are mainly a complex assemblage of secondary uranium minerals resulting from the weathering

of original pitchblende. The remainder of the world production has come mostly from Czechoslovakia, Portugal, England, Australia, and Russia, but the deposits in most of these countries are small and low-grade and are of minor importance at present. (1941)

"E and M J Metal Markets", New York, quoted radium at \$25 to \$30 per Mg of radium content, depending on quantity; September, 1945.

Table 187.—Canadian Refinery Production of Pitchblende Products

Year	\$	Year	\$
1933(b).....	247,900	1938.....	1,045,458
1934.....	159,400	1939.....	1,121,553
1935.....	413,700	1940.....	410,176
1936.....	605,500	1941-1944.....	(a)
1937.....	876,540		

(a) Not available for publication.

(b) First production.

SELENIUM

Selenium is fairly widely distributed, but is not abundant in nature. It occurs in association with sulphur and frequently accompanies the sulphides of heavy metals in the form of selenides. In no case does it occur in quantity large enough to be mined for itself alone.

Commercial selenium is recovered in association with tellurium from the slime or residue produced in the refining of copper. In Canada it is recovered during the refining of blister copper produced in Manitoba, Ontario, and Quebec, and was first produced in the Dominion in 1931 in the copper refinery of International Nickel Company of Canada at Copper Cliff, Ontario. The only other producer in Canada is Canadian Copper Refiners, Limited, with refinery at Montreal East, Quebec, where production was commenced in November, 1934. The Copper Cliff product is derived from the treatment of the copper-nickel ore of the Sudbury district, and that at Montreal East is obtained from the treatment of the gold-copper ore of Noranda, Quebec, and the gold-copper-zinc ore of the Flin Flon mine on the boundary line between Manitoba and Saskatchewan.

Canadian production of selenium in 1944 was 298,592 pounds valued at \$537,466, compared with 374,013 pounds valued at \$654,523 in 1943. The maximum production of 495,365 pounds was reached in 1942. Quebec is the source of about 58 per cent of the total output of the metal, Ontario about 18 per cent, and Manitoba and Saskatchewan the remainder.

Exports of selenium and selenium salts in 1944 were 250,404 pounds valued at \$445,768, compared with 211,530 pounds valued at \$380,493 in 1943.

World production of selenium is believed to approximate 600 to 700 short tons a year, the United States and Canada being the principal sources of supply. Small quantities are produced by several countries, including Russia, Rhodesia, and Mexico.

A plant for the manufacture of selenium compounds was erected in 1944 at Montreal East by Canadian Copper Refiners, Limited.

Selenium is marketed as a black to steel-gray amorphous powder, but cakes and sticks are also obtainable. Among the other products marketed are ferro-selenium, sodium selenite, selenious acid, and selenium dioxide.

The greatest single development in the utilization of selenium since the commencement of war has been its use in electrical rectifiers that have played such an important role in connection with radar and with generators for aeroplanes and army field equipment. Considerable quantities are being used as accelerators in the vulcanization of synthetic rubber. It is also being used to develop free machining qualities in stainless metal. Selenium is used as an

ingredient of austenitic chromium steels. For this purpose it is supplied in bars of selenium-bearing stainless metal. The Battelle Institute has discovered that selenium is useful in producing good ruby glass; is a quality-improver in lubricating oil; and is a potent ingredient of anti-fouling paints for ship bottoms.

Since August, 1938, the nominal price for selenium, black powdered, 99.5 per cent pure at New York has been \$1.75 a pound. "Glass Industry" gives the following quotations for selenium salts in 1943: (1944 not available) barium selenite, \$1.40 to \$1.60 a pound, and sodium selenite, \$1.50 to \$1.65 a pound.

Table 188.—Production of Selenium in Canada, 1931-1944

Year	Pounds	\$	Year	Pounds	\$
1931(*).....	21,500	40,850	1938.....	358,929	622,742
1932.....			1939.....	150,771	266,714
1933.....	48,221	70,345	1940.....	179,860	343,533
1934.....	104,924	171,311	1941.....	406,930	777,236
1935.....	366,425	703,536	1942.....	495,369	951,108
1936.....	350,857	621,017	1943.....	374,013	654,523
1937.....	397,227	687,203	1944.....	298,502	537,466

(*) First commercial production in Canada.

Consumption of selenium in the manufacture of glass in Canada during 1944 was estimated at 2,167 pounds compared with 1,687 pounds in 1943.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry.

TANTALUM-COLUMBIUM

Canada produces no tantalite or columbite and according to the Bureau of Mines, Ottawa, the known Canadian occurrences of these minerals are scarce and of undetermined economic interest. The minerals tantalite and columbite are the tantalate and columbate, respectively, of iron and manganese, with the general formula $(\text{Fe, Mn}) (\text{Ta, Nb})_2\text{O}_6$. They grade one into the other according as whether tantalum or columbium predominates. Both tantalite and columbite were of increasing importance in the war effort and tantalite was placed in the group of "strategic" minerals having the highest priority rating. The occurrence of all tantalum-columbium minerals is restricted to granite-pegmatites, or to residual or alluvial deposits derived from such rock. The chief world sources of tantalite proper have been Western Australia, Belgian Congo, Southern Rhodesia, Uganda, United States and Brazil. The supply of columbite has come mainly from Nigeria, Belgian Congo, Southwest Africa, Argentina and Brazil. The annual world output of tantalite-columbite is small and complete data on same are not available at present. Tantalum metal is highly resistant to corrosion and possesses remarkable conductivity for heat; one of its important uses is in equipment, such as stills, condensers, tubes and heaters in chemical plants and laboratories; it is being used to an increasing extent in the field of electronics. Columbium is employed chiefly as an alloying component in various special-purpose steels, and also in copper, aluminum and other metals.

There are no users of tantalum or columbium ores in Canada, the chief world market being in the United States. The principal American consumer-buyer of tantalite is Fansteel Metallurgical Corporation, North Chicago, Illinois, and of columbite, Electro-Metallurgical Company, 30 East 42nd Street, New York City. These companies have been pioneers in the fields of industrial applications for tantalum and columbium metals, alloys, and products, respectively, and are the leading companies engaged in treating the ores.

United States quotations for tantalum ore, August, 1945 were, per pound Ta_2O_5 , \$2 to \$3 for 60 per cent concentrate, the price depending on the source. Columbium metal, per kilo, base prices: rod \$560; sheet \$500. Tantalum metal, per kilo, base prices, \$160.60 for C.P. rod; sheet \$143; discounts on volume business.

TELLURIUM

Tellurium occurs native and as an essential constituent of several minerals, none of which has been found in commercial quantities. Tellurium-bearing minerals also occur in minute quantities in association with other metallic ores, and the element may be recovered from residues in the refining of copper or lead, and also when sulphuric acid is manufactured from certain varieties of pyrites. The potential recovery and production of tellurium are great, but the demand remains small so that the quantity of refined metal produced is small. Ores containing tellurium occur in British Columbia, Saskatchewan, Manitoba, Ontario, and Quebec.

The electrolytic copper refineries operating in Canada have plants for the recovery of tellurium from their sludges, and for the production of the refined metal. Tellurium was first produced in Canada in 1934 at Copper Cliff, Ontario by International Nickel Company of Canada, Limited. The only other producer, Canadian Copper Refiners, Limited, started production in 1935 at its plant in Montreal East, Quebec. The former plant treats the slime from the refining of the blister copper produced by International Nickel Company at Copper Cliff; and the latter, the slime from the refining of the anode copper of Noranda Mines, Limited, Noranda, Quebec, and the blister copper of Hudson Bay Mining and Smelting Company, Flin Flon, Manitoba. There has been no recovery in Canada from the sludge of sulphuric acid chambers.

Canadian production of tellurium in 1944 was 10,661 pounds valued at \$18,657, compared with 8,600 pounds valued at \$15,050 in 1943 and 11,084 pounds valued at \$17,735 in 1942. Exports of tellurium are not recorded separately.

World production is estimated at 150 short tons a year, or about double the pre-war figure, and Canada and the United States appear to be the main sources of supply.

Metallic tellurium, until a few years ago, was of little industrial importance. Formerly it was used to a small extent in some radio work and also in the photographic arts and for blackening art-silverware. Small quantities are used as a colouring agent in the ceramic industry. When alloyed with lead, the tensile strength and toughness of the lead is increased greatly. Lead alloys containing from 0.1 to 0.5 per cent tellurium have been in use for some time in applications resistance requiring to vibration and corrosion. The use of small quantities of tellurium as a substitute for tin in the lead used for sheathing electric wire cables is reported to improve the resistance of the cables to heat and corrosion. It has also been used for improving the machining qualities of certain steels. Very finely powdered tellurium is used as rubber-compounding material. Its presence is stated to shorten the time of curing and to greatly improve the resisting qualities of the product. A new use for tellurium is as a carbon stabilizer in cast iron in which case it is used in the form of a ferrotellurium.

A nominal price for tellurium of \$1.75 per pound at New York has prevailed since 1938 and throughout 1944. (Bureau of Mines, Ottawa)

Table 189.—Production of Tellurium in Canada, 1934-1944

Year	Pounds	\$	Year	Pounds	\$
1934 (x).....	5,130	25,599	1940.....	3,491	5,607
1935.....	16,425	32,850	1941.....	11,453	18,394
1936.....	35,591	62,997	1942.....	11,084	17,735
1937.....	41,490	71,777	1943.....	8,600	15,050
1938.....	48,237	82,967	1944.....	10,661	18,657
1939.....	2,940	4,769			

(x) First commercial production in Canada.

Table 190.—Consumption of Tellurium in Steel and White Metal Foundries, 1940-1944

Year	Steel Foundries	White Metal Foundries
	(Pounds)	
1940.....	400	629
1941.....	185	492
1942.....	50	612
1943.....	135	453
1944.....	398	531

THALLIUM

Thallium was produced commercially for the first time in Canada in 1944. The output totalling 128 pounds valued at \$1,690 represented the metal contained in residues, produced by the Hudson Bay Mining and Smelting Company, Limited at the Flin Flon smelter, Manitoba. These residues were exported for treatment in foreign plants. Thallium metal was quoted in the United States at \$12.50 per pound, nominal, September, 1945. The element has an atomic weight of 204 and has been used in alloys and glassmaking.

TIN

Tin is widely distributed, but in only a few countries are the deposits sufficiently large for commercial development. Cassiterite (SnO_2) is the only important ore of tin and in the pure state it contains 78.6 per cent of the metal. Stannite, a sulphide of copper, iron, and tin, has little importance as an ore.

In British Columbia the small cassiterite content of the silver-lead-zinc ore of the Sullivan mine at Kimberley now being recovered from the zinc tailing is the source of Canada's production of tin. Stannite is present in the ore of the Snowflake property near Revelstoke, and cassiterite and stannite have been noted at several other places in the province. Cassiterite occurs also in many other places in Canada, but no commercial deposits have been found. In the unglaciated parts of Yukon, stream tin has been found in small quantities, but no serious attempt seems to have been made to test the gravels thoroughly for tin. During the past few years it has become apparent that the gold-bearing placers in many creeks in the Mayo district contain some crystalline cassiterite. Some evidence has been gathered showing the likelihood of there being from 200 to 300 tons of tin available as cassiterite in the placers of Dublin Gulch and Haggart Creek. In August, 1943, a lode source of this tin was found on the north side of Dublin Gulch assaying from $\frac{3}{4}$ to $1\frac{1}{2}$ per cent tin across an approximate width of 3 feet.

The tin concentration plant of Consolidated Mining and Smelting Company at Kimberley commenced operation on March 1, 1941, and has been functioning very satisfactorily. The plant for the production of refined tin also at Kimberley was brought into commercial operation in April, 1942. The tin content of the ore is small and the recovery is proportionately small.

Production of tin in 1944 was 516,626 pounds valued at \$299,643, compared with 776,937 pounds valued at \$450,623 in 1943. Imports of tin in the form of blocks, pigs, tin foil, and collapsible tubes in 1944 were valued at \$2,178,118, compared with \$1,766,334 in 1943.

The tin produced at Kimberley and the small domestic recovery of secondary tin are far from sufficient to meet the Canadian requirements, which in peacetime amounted to about 3,000 tons a year and are now much larger. These requirements were formerly obtained mostly from smelters in the Straits Settlements. The position of the Allied countries in respect to tin became critical with the capture by Japan of these smelters and of the Malayan tin mines, and the civilian use of the metal has been greatly curtailed. The search for commercial deposits of tin in Canada was continued and some occurrences of possible economic interest were found by a Geological Survey party in the Yellowknife area, Northwest Territories. Elsewhere, the results were not encouraging.

The world smelter production of tin in 1939 (data for war years incomplete) was 175,500 long tons.

Because of changing conditions and the wide range in the market value of the metal, no definite statement can be made as to what constituted payable ore. Under wartime conditions, however, provided the deposit is reasonably large, it is worthy of attention even though the grade of the material is lower than would ordinarily be regarded as suitable for commercial development. Most tin ores are too low in grade to be treated directly and accordingly must be concentrated. Concentrates are in most cases purchased on a 60 per cent tin basis and for each unit or fraction above or below 60 per cent the returning charge is reduced or increased. They are subject to penalties if they contain more than one per cent sulphur and 5 per cent

iron. Antimony, arsenic, bismuth, copper, lead, and other impurities are not penalized. Consolidated Mining and Smelting Company is prepared to treat tin concentrate at its new smelter at Kimberley to the limit of its relatively small capacity.

The only other tin smelter on the North American Continent is at Texas City, Texas. This Government-sponsored smelter was built by Tin Processing Corporation of New York and had originally a capacity of 50,000 long tons of concentrate or 18,000 long tons of tin a year. Built to treat the portion of Bolivian ores made available to the United States (50,000 long tons of concentrate), it was ready for operation in April, 1942. Subsequent enlargements raised the capacity of the smelter to 90,000 long tons a year. In 1944 it was producing at the rate of 30,000 long tons of metal a year. Following its entry into the war, the United States took over all the supplies of the metal in that country and specific allocation of tin was taken over by the Director of Priorities.

Tin is used chiefly in the manufacture of tin plate, mainly for use in the making of tin cans and of containers of all kinds. It is a necessary ingredient of solder and is a component part of most babbitt and other anti-friction metals, without which manufacturing and transportation would be impossible. Smaller quantities are used in foil, which in turn is used for wrapping food, tobacco, etc.; interne-plate, pipe and tubing; type metal; bronze; galvanizing; and in bar tin.

The price of tin in New York was fixed in August, 1941, at 52 cents a pound and there has been no change since then. (Bureau of Mines, Ottawa)

Table 191.—Production of New Tin in Canada, 1941-1944

Year	Pounds	\$
1941 (*).....	64,744	33,667
1942.....	1,237,863	643,689
1943.....	776,937	450,623
1944.....	516,626	299,643

(*) First commercial production.

Table 192.—Consumption of Tin in Canada by Industries, 1940-1944

	1940	1941	1942	1943	1944
	(short tons)				
Brass and bronze foundries.....	277	437	217	357	290
White metal foundries.....	2,087	3,141	1,530	1,106	1,264
Steel foundries (chiefly for tin plate).....	1,207	2,346	1,428	1,148	1,517
Iron foundries.....	84	224	49	88	87
Galvanizing plants.....	90	50	226	28	28
Jewellery and silverware plants.....	64	146	15		
Electrical apparatus plants.....	43	56	6	42	46
Miscellaneous industries.....	16	36	30	10	10
Total accounted for.....	3,868	6,436	3,501	2,779	3,242

Production of secondary tin in Canadian plants in 1944 was estimated at 22,935 pounds compared with 16,560 pounds in 1943.

Table 193.—Imports Into Canada and Exports of Tin and Tin Products, 1943 and 1944

Item	1943		1944	
	Pounds	\$	Pounds	\$
IMPORTS				
Tin in blocks, pigs or bars.....	2,631,100	1,504,438	2,682,300	1,767,779
Tin foil.....	829,394	106,174	1,625,265	217,978
Collapsible tubes.....		155,722		192,361
Tin bichloride and tin crystals.....	11,054	5,031	10,139	4,807
Oxide of tin and copper.....	142,986	30,274	168,462	38,954
Phosphor tin and phosphor bronze in blocks, bars, plates, etc..	708,624	321,408	735,419	361,916
Tin plate food containers.....		258,084		244,780
Tin plate containers, n.o.p.....		84,721		116,370
Sheets, tin and lead coated.....	20,230,500	877,446	35,589,700	1,582,839
Manufactures of tin plate painted, etc., manufactures of tin, n.o.p.		498,633		426,833
Kitchen or dairy holloware of iron or steel coated with tin.....		82,892		75,757
Arseniate, biarseniate and stannate of soda.....	83,329	18,712	86,475	24,488
Tin plate scrap.....	2,354,000	21,285		
Tin plate, n.o.p.....	64,485,400	3,679,160	44,332,300	2,496,682
EXPORTS				
Tinware.....		10,236		66,500
Tin plate scrap.....	26,799,600	135,557	31,914,500	145,824

TITANIUM

All known occurrences of titanium in Canada of possible economic interest are in Quebec and Ontario. Ilmenite or titanite iron (FeTiO_3), in commercial quantities and containing from 18 to 25 per cent of titanium is found at St. Urbain in Charlevoix county, and at Ivry in Terrebonne county, Quebec. Rutile (TiO_2), which usually contains 54 to 59 per cent titanium, is found mixed with the ilmenite in parts of one of the St. Urbain occurrences and in sufficient quantities to make it of possible importance for the rutile alone, this being the only known workable deposit of rutile in Canada. Titaniferous magnetite (magnetite containing 3 to 15 per cent titanium) deposits occur on the Saguenay River, near Lake St. John, and at Bay of Seven Islands, both in Quebec, and on the shores of Seine Bay and Bad Vermilion Lake in Western Ontario.

The Canadian output of ilmenite is shipped annually from the St. Urbain deposits, part of it to Niagara Falls, New York, presumably for use in the manufacture of ferrotitanium, and part of it to plants of the General Electric Company in the United States. No shipments from the Ivry deposits have been reported for several years.

The production of titanium ore (ilmenite) in 1944 was 33,973 tons valued at \$165,195, compared with 69,437 tons valued at \$308,290 in 1943. Imports of titanium, which are in form of the oxide, are not recorded separately.

The world production of titanium ore is estimated at about 300,000 tons of ilmenite and 9,000 tons of rutile. India is the principal producer of ilmenite, the other important producers being Norway, Malaya, Portugal, Australia, United States, and Canada. The principal producers of rutile are Brazil, New South Wales (Australia), and the United States.

The United States became virtually self-sufficient in supplies of ilmenite with the completion of the plan to exploit the Adirondack titaniferous iron ores. This deposit, known as the MacIntyre Development, is at Newcomb, Essex county, in northeastern New York State. Development of the property was started in 1941 by the Titanium Division of the National Lead Company, and the property was put into production in August, 1942. The program of operations called for a daily mine output of 5,500 long tons of ore analysing 16 per cent TiO_2 , from which were to be produced 800 long tons of ilmenite concentrate containing about 48 per cent TiO_2 . Titanium ore is also produced in the United States in Arkansas, Carolina, Florida, and Virginia. The ilmenite concentrates shipped run from 42 to 54 per cent TiO_2 , and rutile concentrates from 92 to 95 per cent TiO_2 .

Commercial uses for titanium in recent years have continued to increase independently of the trend of general business. Ilmenite continues to be used chiefly in the manufacture of

white pigment, and it is used to a smaller extent for making ferro-alloys. In Metallurgy, titanium is not only an effective deoxidizer and cleansing agent, but also an alloying element. By addition of titanium, chrome-nickel steels are made more resistant to corrosion and chrome-molybdenum steels become easier to weld. In aluminium and sundry non-ferrous alloys, titanium refines the grain and otherwise contributes to better structure. A variety of carbontitanium alloys are now available. Titanium-treated rails are said to be superior to those treated with silicon. In other industries titanium compounds have many different uses. Rutile is used chiefly in welding-rod coatings, in steel manufacture, and in the ceramic industry.

The situation with respect to titanium dioxide pigments has remained unchanged during 1944. All of Canada's requirements were imported from the United States and the expanding demand continued to be met.

The New York quotation for ilmenite remained at \$28 to \$30 per gross ton of 60 per cent TiO_2 f.o.b. Atlantic seaboard. The price for rutile 94 per cent TiO_2 remained at 8 to 10 cents per pound of concentrate. The price of ferro-carbontitanium f.o.b. plant remained at \$142.50 a ton, and metallic titanium at \$5 to \$5.50 a pound throughout 1944. (Bureau of Mines, Ottawa)

Table 194.—Production of Titanium Ore in Canada(*), 1927-1944

Year	Short ton	\$	Year	Short ton	\$
1927.....	2,029	8,980	1936.....	2,566	18,318
1928.....	2,244	6,732	1937.....	4,229	26,432
1929.....	2,748	7,359	1938.....	207	1,449
1930.....	412	1,239	1939.....	3,694	21,267
1931.....	1,509	10,261	1940.....	4,535	24,510
1932.....	.....	.....	1941.....	12,651	49,110
1933.....	.....	.....	1942.....	10,031	50,906
1934.....	2,023	14,161	1943.....	69,437	308,290
1935.....	2,288	16,400	1944.....	33,973	165,195

(*) All from Quebec.

Table 195.—Consumption of Titanium Pigments in Canadian Paint Industry, 1937-1944

Year	Reduced Titanium Pigments (*)		Titanium White	
	Pounds	Cost at works	Pounds	Cost at works
		\$		\$
1937.....	3,748,341	362,869	1,299,857	193,107
1938.....	3,903,337	378,548	1,341,359	200,552
1939.....	5,088,234	494,914	1,855,288	275,103
1940.....	6,138,760	616,360	2,297,248	344,945
1941.....	8,971,865	1,004,591	3,076,490	560,621
1942.....	11,202,473	1,399,884	4,168,097	820,990
1943.....	13,994,999	1,580,995	4,436,382	811,086
1944.....	13,176,631	1,061,614	4,600,654	933,199

(*) Containing titanium oxide.

Table 196.—Consumption of Ferrotitanium in Manufacture of Steel in Canada, 1939-1944

Year	Tons	\$
1939.....	118	23,498
1940.....	118	24,233
1941.....	181	52,128
1942.....	439	66,555
1943.....	614	118,416
1944.....	786	149,527

TUNGSTEN

The supply of tungsten, which was critically short during 1943, is now in excess of the demand. Consequently, the output of Canadian concentrates ceased at the end of 1943, but stocks at the mines were shipped during 1944. In the first quarter of 1945 consumption increased for a special war use, but by the end of April orders were cancelled, and at the present rate of consumption Canada has nearly two years' supply of tungsten. Resumption of mining operations thus appears unlikely, but if an urgent demand again arises, Canada's requirements can be adequately supplied from the Emerald property in southern British Columbia.

Wolframite, $(\text{Fe}, \text{Mn})\text{WO}_4$, is the principal ore of tungsten; the next in importance being scheelite (CaWO_4), a calcium tungstate. The former is a dark brown to black, heavy mineral, which contains 76.4 per cent WO_3 (tungstic oxide) when pure, and is not common in Canada. Scheelite, the chief Canadian ore of tungsten, is a heavy, fairly soft, usually buff, but sometimes white mineral with a dull lustre, which contains 80.6 per cent WO_3 when pure. It is commonly associated with quartz and frequently occurs in gold-bearing veins and in certain contact metamorphic deposits. It can be detected readily in the dark by its brilliant, pale bluish-white fluorescence under ultra-violet light and purple filter.

Intensive prospecting in 1941 and 1942 by means of the ultra-violet lamp revealed several hundred occurrences of scheelite distributed in every province except Alberta, the majority as well as the largest deposits being in British Columbia. All, except three or four, of the deposits are small and in many of them the scheelite is associated with gold ores and was recovered as a by-product of gold mining operations.

In Nova Scotia, the production came from the Indian Path mine near Lunenburg on the south coast, and from the Moose River property 35 miles northeast of Halifax.

The production from Quebec was hand-picked ore from a number of gold mining operations.

In Ontario, over 90 per cent of the output came from Hollinger Consolidated Gold Mines, Timmins, and most of the remainder came from Little Long Lac and Kerr Addison gold mines. Fairly massive scheelite occurs in the Hollinger mine in zones or bodies in quartz close to the porphyry, from the surface down to the 5,150-foot level.

In British Columbia, which was the leading producer of scheelite, the chief source of output was Consolidated Mining and Smelting Company's Red Rose mine, south of Hazelton. The remainder of the production came from the Emerald deposit, 6 miles southeast of Salmo in southern British Columbia, and from several producers in the Bridge River area. The Emerald ore is rather finely disseminated, usually in impure limestone with garnetite, and occurs in several contact metamorphic zones, mainly between granite and argillite.

In the Yukon, the output came from placer operations, and in the Northwest Territories it came mainly from Outpost Island in Great Slave Lake.

As noted, there was no production in 1944. Shipments consisted of concentrates on hand at mines and mills and comprised, in the main, the 1943 output from the Emerald property. The shipments amounted to 443.4 tons of high-grade and low-grade concentrates which contained 142.5 tons of WO_3 (114 tons of tungsten) valued at \$245,780. They included 310 tons of low-grade concentrate (48 tons of WO_3) that was shipped to the United States for treatment.

Shipments in 1943 reached a record of 754 tons of concentrate (327 tons of tungsten) valued at \$1,083,538, and from the start of the war to the end of 1944 they amounted to 1,510 tons of concentrate containing 742 tons of WO_3 (594 tons of tungsten) valued at \$1,786,525. Most of this was 70 to 75 per cent WO_3 concentrate which was shipped to Atlas Steels, Limited, Welland, Ontario. The remainder consisted of low-grade (10 to 15 per cent WO_3) concentrate and was shipped to the United States for further treatment. All concentrates in stock at January 1, 1944, have now been shipped with the exception of about 33 tons of very low-grade material at the Val d'Or plant. Stocks at Welland and in storage at Niagara Falls at end of 1944 amounted to 515 tons of contained tungsten.

Consumption was about 232 tons of tungsten contained in scheelite and ferrotungsten, compared with 390 tons in 1943. No tungsten ore was imported in 1944.

In Nova Scotia, production of tungsten ore was discontinued late in 1942.

In Quebec, the output was shipped to the Val d'Or plant of the Quebec Department of Mines for treatment until November, 1943, when this service was discontinued.

In Ontario, the scheelite mill at the Hollinger mine entered production early in 1942 and was closed in September, 1943, during which period it produced about 275 tons of high-grade concentrate, which contained about 195 tons of WO_3 . The ore averaged 0.37 per cent WO_3 .

In British Columbia, production at the Red Rose property was started in January, 1942, and was discontinued in October, 1943, during which period 600 tons of high- (73.8 per cent) and low- (14 per cent) grade concentrates (344 tons of WO_3) were shipped, the average grade of the ore treated being 1.64 per cent WO_3 .

The Emerald deposit was discovered early in 1942 and production from the 300-ton mill was started in July, 1943. The property, which was operated by a Crown company, was closed in October, 1943, as a result of the marked improvement in the tungsten situation. During the short period of operations high- (72 per cent) and low- (15 per cent) grade concentrates containing 137 tons of WO_3 were produced, the average grade of ore treated being 1.7 per cent WO_3 . Estimates of reserves are 250,000 tons of 1.25 per cent WO_3 ore, apart from the ore in numerous minor bodies. The output from properties in the Bridge River area amounted to about 12 tons of WO_3 .

The total output from the Yukon and the Northwest Territories amounted to about 21 tons of contained WO_3 .

From 1939 to May, 1944, when shipments ceased, the Bureau of Mines, Ottawa, received about 210 tons of ore from about 60 producers across the Dominion for treatment. From this ore about 63 tons of concentrate which contained 40 tons of WO_3 was recovered and shipped. A small quantity of concentrates were on hand in 1945.

Canada has no plants for the manufacture of ferrotungsten or other tungsten addition agents and the only company making tungsten steels is Atlas Steels, Welland, Ontario. Only scheelite is used by the company at present, and the high-grade (not less than 70 per cent WO_3) concentrate is added directly to the steel bath. This is possible because of the comparative ease with which the calcium forms a slag.

World production of tungsten ore and concentrate in 1939, on a basis of 60 per cent WO_3 , was about 40,000 metric tons, and the principal producers were China, Burma, United States, Bolivia, Malaya, Spain, Portugal, Korea, Japanese-controlled areas in south China, Australia, Argentina, Brazil, and South Africa. China was the chief source of tungsten for 20 years prior to 1939, the record production being 16,257 metric tons of 60 per cent WO_3 in 1937. The ore mainly occurs as wolframite. Most of the mines in Kiangsi Province, where the largest deposits occur, are still under Chinese control. In Burma, the Mawchi tin-tungsten mine, 170 miles northeast of Rangoon, was the principal producer. Bolivia is the principal producer in South America. In Europe the most extensive tungsten deposits occur in Trás-os-Montes in north-eastern Portugal.

In the United States, output in 1944 is estimated at 10,500 tons of 60 per cent WO_3 , compared with the record of 12,045 tons in 1943. Most of the output came from Idaho, California, and Nevada. Approximately half the United States 1944 production came from the Bradley Mining Company's operations at Yellow Pine, near Stibnite, Idaho. The tungsten plant at Salt Lake City, operated by the U.S. Vanadium Corporation for the Metal Reserve Company, closed down in April, 1944. Most of the Canadian low-grade concentrate was shipped in the past to this plant for chemical treatment. Most of the ore mined in the United States is scheelite which occurs mainly in contact metamorphic deposits of tectite or skarn (garnet-epidote-diopside-calcite-quartz-complex) and is somewhat similar to the deposits in southern British Columbia.

As an alloying metal in steel, tungsten (usually as ferrotungsten, but sometimes as calcium tungstate or scheelite concentrate) is used essentially to impart hardness and toughness, which are maintained even when the steel is heated to a high temperature. Almost 80 per cent of the consumption of tungsten in the United States is used for the production of high-speed steels for cutting tools, in which the tungsten content is 15 to 20 per cent. Alloy steels containing tungsten are being used extensively in making armour plate, armour-piercing projectiles, and other military equipment. The use of tungsten in hard facing compounds is growing. Minor amounts of tungsten are used in steels for dies, valves, and valve seats for internal combustion engines, and for permanent magnets. Stellite, the best known non-ferrous alloy, contains 10 to 15 per cent tungsten with higher percentages of chromium and cobalt, and accounts for about 2 per cent of the tungsten consumed. Tungsten carbide is widely used as an extra hard cutting tool and for projectiles. Pure tungsten is used in lamp filaments (about 1.5 per cent of the total tungsten consumption), in radio tubes, contact points, etc.

Until production ceased late in 1943, all sales of Canadian concentrate were made through the Metals Controller, Ottawa, at a price of \$26.50 a short unit (20 pounds) of WO_3 for concentrate containing 70 per cent WO_3 (within specifications), delivered at Welland, Ontario. Since then the price has fluctuated downward and is unstable. (Bureau of Mines, Ottawa)

Table 197.—Production (Commercial Shipments) of Crude Tungsten Concentrates in Canada, 1912-1944

Year	Pounds	\$	Average per cent WO_3
1912.....	28,000	(a)	72
1917.....	580	234	69.41
1918.....	(c) 27,000	11,700	73.8
1939.....	8,825	4,917	(a)
1940.....	12,002	7,303	70-75
1941.....	(b) 82,846	38,712	51.1
1942.....	520,981	406,275	61.8
1943.....	1,508,621	1,083,538	54.2
1944.....	886,745	245,780	31.9

(a) Not recorded.

(b) Includes export of considerable low-grade material to U.S.A.

(c) Included 11 tons produced at Burnt Hill, N.B., with smaller shipments from Yukon, Nova Scotia and Manitoba.

Table 198.—Tungsten Consumed in Specified Industries, 1938-1944

Year	Tungsten wire used in manufacture of Canadian electrical apparatus and supplies	Ferro-tungsten consumed in Canada in the manufacture of steel (*)		Tungsten metal consumed in Canada in the manufacture of steel and alloys (x)
	Value \$	Long tons	Value \$	Pounds
1938.....	50,594	30	69,806	.....
1939.....	52,207	95	173,250	13,089
1940.....	62,175	336	829,859	15,474
1941.....	82,696	482	1,003,314	29,729
1942.....	129,265	577	1,440,141	36,882
1943.....	93,862	491	1,721,967	23,000
1944.....	109,947	86	287,116	20,005

(*) Other than tungsten-chromium.

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid and in the non-ferrous, glass, ceramic and color industries.

The United States Bureau of Mines reports that vanadium has been and is now being obtained by some countries from other than vanadium ores, including petroleum, bauxite, phosphate rock and titaniferous magnetites; the ever-increasing demand for vanadium directs attention to all possible vanadium sources, as well as to efforts to extend known deposits. In the United States the principal ores are roscoelite and carnotite in sandstones, disseminated or in spots, bunches, lenses and seams. Vanadium was among the metals included in the inventory control provided by General Metals Order 1, May 1, 1941, issued by the United States Office of Production Management.

Data relating to possible imports of vanadium ores or vanadium compounds or alloys are not shown separately in Canadian trade reports. In 1943 there were 204 tons of ferrovanadium valued at \$558,717 consumed in Canada in the manufacture of steel compared with 67 tons at \$176,596 in 1944.

Vanadium ore was quoted September, 1945: 27½ cents per pound contained V_2O_5 , f.o.b. shipping point, by "E & M J Metal and Mineral Markets", New York.

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec.

Zircon is used to a steadily growing extent in refractories, specialized porcelains and heat-resisting glass.

Zircon is recovered from the beach sands near Melbourne, Florida, by the Riz Mineral Company, as an accessory of titanium ore and from the gravels near Lincoln, California, as a by-product of gold dredging. Zirconium metal purifies, hardens, and strengthens steels and acts with aluminum to harden cupronickel. Metallic zirconium as powder or ductile metal is used in photoflash bulbs, radio tubes, ammunition primers and welding rods. In 1941 (January-September) there were 20,101 short tons of zirconium ore valued at \$446,286 imported into the United States; of these 73 per cent came from Australia, 24 per cent from Brazil and 3 per cent from British India. Canadian consumption of ferrozirconium in the manufacture of steel totalled 51 short tons valued at \$7,337 in 1943.

Zircon ore was quoted in September, 1945 by "E & M J Metal and Mineral Markets", New York: per ton f.o.b. Atlantic seaboard, minimum 55 per cent ZrO_2 , \$65 to \$75 nominal. Zirconium alloy, 12 to 15 per cent Zr, 39 to 43 per cent Si, \$102.50 to \$107.50 per gross ton; 35 to 40 per cent Zr, 47 to 52 per cent Si, 14 to 16 cents per pound.

Table 199.—Principal Statistics(*) of the Miscellaneous Metal Mining Industry in Canada, 1943 and 1944

	1943	1944
Number of firms.....	54	27
Number of plants.....	59	27
Capital employed (a).....	\$ 15,603,307	(b)
Number of employees—On salary.....	277	237
On wages.....	1,687	1,148
Total.....	1,964	1,385
Salaries and wages—Salaries.....	\$ 600,684	485,401
Wages.....	\$ 3,694,469	2,323,612
Total.....	4,295,153	2,809,013
Value of production (gross).....	\$ 9,062,368	5,360,993
Cost of fuel and electricity.....	\$ 1,059,552	951,929
Process supplies used.....	\$ 1,215,049	657,430
Smelter charges.....	\$ 2,759	58,937
Freight.....	\$ 263,513	389,554
Value of production (net).....	\$ 6,521,495	3,286,886

(*) Does not include data relating to smelters and refineries or to mining in the Northwest Territories.

(a) Exclusive of ore reserves.

(b) Data not recorded in 1944.

Table 200.—Employees, Salaries and Wages in the Miscellaneous Metal Mining Industries in Canada, 1944

	Number of employees		Salaries and wages
	Male	Female	\$
Salaried employees—			
Total.....	198	39	485,401
Wage-earners—			
Surface.....	700	42	2,323,612
Underground.....	266		
Mill.....	128	12	
Total.....	1,094	54	2,323,612
Grand Total.....	1,292	93	2,809,013

Table 201.—Average Number of Wage-Earners Employed, by Months, 1942-1944

Month	1942 Total	1943 Total	1944				
			Surface		Under- ground	Mill	
			Male	Female		Male	Female
January.....	783	1,645	763	66	454	167	1
February.....	826	1,583	829	60	428	173	1
March.....	858	1,616	768	57	416	167	3
April.....	906	1,527	766	48	362	174	12
May.....	911	1,610	794	41	256	144	15
June.....	1,024	1,773	757	34	231	126	18
July.....	1,152	1,849	731	33	210	126	18
August.....	1,282	1,900	643	33	179	101	20
September.....	1,344	1,728	612	34	164	92	16
October.....	1,463	1,668	593	30	163	86	18
November.....	1,602	1,694	575	26	168	91	17
December.....	1,678	1,504	525	27	173	80	1

CHAPTER SIX

THE NON-FERROUS SMELTING AND REFINING INDUSTRY IN CANADA

The Non-Ferrous Smelting and Refining Industry, as defined by the Dominion Bureau of Statistics, comprises those firms engaged primarily in the smelting of non-ferrous ores or concentrates and the refining of metals recovered therefrom.

The net value added by the industry in the processing of crude or semi-crude material during 1944 totalled \$123,303,038 compared with \$111,857,020 in 1943. Refined products included gold, silver, nickel, copper, lead, zinc, aluminum, tin, magnesium, antimony, bismuth, cobalt, cadmium, selenium, tellurium, and sulphur; other end products of individual plants or companies were copper-nickel matte, cobalt salts, cobalt oxide, nickel oxide, nickel salts, bauxite concentrates, arsenious oxide, sulphuric acid, platinum metals residues, zinc oxide, zinc dust, thallium residues and blister and anode copper. Statistics relating to the production of pitchblende products at Port Hope, Ontario, and general data pertaining to the recovery of mercury at Pinchi Lake, British Columbia, are not included in this report.

The value added by processing in non-ferrous metallurgical plants during 1944 represents a 10.4 per cent increase over the corresponding value realized in 1943. This increase is not the result of a general expansion in plant output but reflects chiefly the recovery of certain metal from relatively large quantities of crude material semi-processed and stock piled in 1943; the cost of this semi-processed material being included in the cost of material treated in 1943. This applied particularly to the aluminum industry. As thus qualified, the total costs of both foreign and domestic ores and concentrates and matte, scrap metal, etc., etc., treated in Canadian non-ferrous metallurgical plants during 1944 was estimated at \$281,266,002 compared with \$317,917,186 in 1943. It should be noted, in a study of these data, that firms operating both mines and smelters may vary from year to year the nominal values of crude ores, etc., shipped from their mines to their own smelters, with the result that in some years the mining industry proper is favoured economically at the expense of the non-ferrous smelting and refining industry and vice versa. The total annual net value of commodity production for the Dominion as a whole is, however, not affected by these arbitrary (internal) evaluations.

Fuels and purchased electricity consumed by the industry in 1944 totalled \$36,907,623 compared with \$43,105,101 in 1943. The value of chemicals and other process supplies consumed during the year under review amounted to \$32,730,138 as against \$38,334,069 in the preceding year.

Employees during 1944 totalled 23,927 compared with 26,749 in 1943. Salaries and wages paid in 1944 amounted to \$44,536,991 as against \$48,491,732 in the preceding year. The 20,556 wage-earners in 1944 included 19,550 males and 1,006 females compared with 22,577 and 797, respectively, in the preceding year.

Table 202.—Principal Statistics of the Non-Ferrous Metallurgical Industry in Canada, 1942-1944

	1942	1943 (b)	1944 (b)
Number of companies.....	10	9	9
Number of plants.....	15	16	16
Capital employed.....			(c)
Number of salaried employees.....	\$ 356,052,965	392,217,159	3,371
Salaries.....	2,625	3,375	7,816,181
Number of wage-earners.....	\$ 5,286,755	7,160,290	20,556
Wages.....	18,537	23,374	36,720,810
Value of plant products (gross) (a).....	\$ 32,053,801	41,331,442	474,206,801
Estimated cost of ores, concentrates, etc., treated.....	\$ 447,617,199	511,213,376	281,266,002
Cost of fuel and purchased electricity.....	\$ 258,903,818	317,917,186	36,907,623
Process supplies, (other than ores, fuel, etc.).....	\$ 35,748,639	43,105,101	32,730,138
Value added by smelting (net) (d).....	\$ 27,083,695	38,334,069	123,303,038
	\$ 125,881,047	11,857,020	

(a) The gross value of production should not be interpreted as the ultimate sale value of finished metal only, as it represents the combined values of all industry (smelting, refining, etc.) end products (blister, copper matte, etc.) and in this sense represents a duplication in values.

(b) Data in this report for 1943 and 1944 do not include those relating to Eldorado Mining and Refining Ltd.

(c) Data not collected in 1944.

(d) See preceding text.

Table 203.—Number of Wage-Earners, by Months, 1940-1944

Month	1940	1941	1942		1943		1944	
			Male	Female	Male	Female	Male	Female
January.....	11,225	12,927	15,778	31	22,322	522	22,193	954
February.....	11,297	13,052	16,298	32	23,120	560	21,737	943
March.....	11,298	13,102	16,434	34	23,089	653	21,013	919
April.....	11,403	13,617	16,617	39	22,788	727	20,488	922
May.....	11,691	14,275	17,223	53	22,552	773	19,574	988
June.....	11,794	14,503	18,297	68	22,968	843	19,452	1,023
July.....	12,102	14,634	18,900	75	22,785	886	19,389	1,089
August.....	12,256	14,788	19,346	81	22,538	917	18,928	1,093
September.....	12,251	14,815	19,091	206	22,186	943	18,088	1,069
October.....	12,316	14,995	20,076	424	21,856	938	18,175	1,052
November.....	12,481	15,055	20,953	570	22,337	904	18,319	1,024
December.....	12,771	15,371	21,239	605	22,393	903	16,794	989
Average.....	11,908	14,264	18,352	185	22,577	797	19,550	1,006

NOTE.—No female wage-earners were reported prior to 1942.

Table 204.—Capacities of Canadian Copper Smelting and Refining Works, 1944 (*)

Company	Blast Furnaces		Reverberatories		Converters
	Number	Annual capacity—tons of ore and concentrates	Number	Annual capacity—tons of ore and concentrates	Number
Falconbridge Nickel Mines, Ltd.....	2	480,000			3
Hudson Bay Mining & Smelting Co. Ltd.....			1	675,000	3
Noranda Mines, Ltd.....			2	1,300,000	5
International Nickel Co. of Canada, Ltd.—					
Copper Cliff.....	2	430,000	9	3,500,000	20
Coniston.....	4	950,000			5
Electrolytic Copper Refineries—					
		Annual Capacity—Short tons			
		1944			
Canadian Copper Refiners, Ltd.....		112,000			
International Nickel Co. of Canada, Ltd.....		168,000			

(*) American Bureau of Metal Statistics.

Table 205.—Lead Smelting Capacity of Canada, 1944

Company	Number of blast furnaces	Annual capacity tons of charge
Consolidated Mining & Smelting Company of Canada, Limited, Trail, B.C.....	5	700,000

Table 206.—Capacity of Electrolytic Zinc Plants in Canada, 1944

Company	Estimated annual capacity for cathode zinc short tons
Consolidated Mining & Smelting Company of Canada, Ltd.....	180,000
Hudson Bay Mining & Smelting Co., Ltd.....	57,500

Aluminum Company of Canada Ltd.—The ore treatment plant of the company, located at Arvida, Quebec, was in continuous operation throughout 1944. This plant produces concentrates from which metallic aluminum is recovered. The crude bauxite ore employed in the production of these concentrates is imported. During the year under review the company produced primary aluminum ingot at each of its five reduction plants located at Arvida, Shawinigan Falls, La Tuque, Isle Maligne and Beauharnois, all situated in the province of Quebec. Production of primary ingot in 1944 totalled 924,130,162 pounds compared with the all-time high record of 991,499,296 pounds in 1943. The company reported that during the five war years ending December 31, 1944, only 6 per cent of Canadian production was consumed in Canada, while the United Kingdom was the largest buyer, having purchased approximately 55 per cent of production. The United States was second with approximately 32 per cent of the total. Russia took 4.3 per cent, and Australia 1.2 per cent; other United Nations absorbed the remaining 1.5 per cent.

Noranda Mines Ltd.—During 1944 the smelter treated 1,048,438 tons of ore, concentrate and slag, including 339,820 tons of custom ores and concentrates, and produced 117,171,962 pounds of anodes. After deducting the copper, gold and silver which were recovered from slags received from various shippers, the estimated production of new metals was 113,086,814 pounds of fine copper, 246,990 ounces of gold, and 1,373,482 ounces of silver. The estimated recovery from Horne mine ore and concentrate was 56,580,845 pounds of copper, 196,402 ounces of gold, and 508,126 ounces of silver.

During the year under review, the concentrator treated 1,055,473 tons of ore from the Horne mine, from which 203,833 tons of copper-gold concentrate were produced and sent to the smelter. The cyanide mill treated 217,267 tons of pyrite from the flotation circuit tailing, from which 16,586 ounces of gold were recovered; 187,485 tons of pyrite were recovered from the cyanide mill tailing and sold to chemical plants. For the first two years of the war the company was able to maintain a normal working force, but early in 1942 began to lose workmen at a faster rate than they could be replaced. The working force continued to decline and by June, 1944, the average number of mine employees working had dropped to 525, which necessitated a further reduction of about 10 per cent in ore production. In November and December there were small increases in the average number of employees working and the company hopes that the trend has been reversed and that there will be a gradual return of mine workers in 1945.

The contract between the company and the British Ministry of Supply, under which all the company's copper production over and above Canadian requirements was sold to His Majesty's Government since the commencement of the war in September, 1939, was terminated on January 1, 1945.

Canadian Copper Refiners Ltd.—The refinery of the company located at Montreal East, Québec, was operated throughout 1944. Production during the year amounted to 103,000 tons of copper; 396,000 ounces of gold; 3,380,000 ounces of silver and 235,000 pounds of selenium. A new copper sulphate plant was being constructed early in 1945.

International Nickel Company of Canada Ltd.—The annual report of the company for 1944 states:

"Throughout the year 1944 our chief objective continued to be the production of sufficient strategic metals to meet the full war demands of the United Nations. This was attained notwithstanding that the output of nickel was lower than in 1943 due to continued labour shortage and to the use of inexperienced labour. These unfavourable factors also had the effect of increasing the production costs. With sufficient man-power, our plants are equipped for record production. The total number of employees at the year end was 21,881 comparable with 22,205 at December 31, 1943.

"Sales of nickel in all forms, derived from our own mine production, amounted to 250,212,561 pounds, a decrease of 15,176,762 pounds from 1943; our sales together with the volume refined for others, totalled 285,238,333 pounds. Sales of copper in all forms, derived from our own mine production, amounted to 269,006,131 pounds, comparable with 265,487,525

in 1943; our sales, together with the volume refined for others, totalled 314,684,817 pounds. Sales of gold and silver were 61,838 ounces and 1,784,633 ounces respectively and of selenium and tellurium 85,519 pounds and 7,087 pounds respectively.

"On September 19, 1944 an armistice agreement was entered into between Russia and Finland terminating hostilities. By the terms of the armistice the Petsamo district was ceded by Finland to the Soviet Government and the ownership of the nickel mines and installations passed to that government. The Government of Canada has informed us that a protocol to the armistice agreement was signed in Moscow on October 8, 1944, by the Canadian and United Kingdom ambassadors and a representative of the Soviet Government whereby the Soviet Government has undertaken to pay \$20,000,000 (U.S. currency) to the Canadian Government as full and final compensation to the company and its subsidiary, The Mond Nickel Company Limited. . . ."

Falconbridge Nickel Mines Ltd.—The company reported as follows:

"During the year, ore dressing plant, mill and smelter have operated practically without interruption and with no particular changes or additions in equipment or changes in mode of operations. The metal losses have been the lowest since the start of the company. The regularity of operations has been somewhat hampered by difficult labour conditions and consequent occasional shortage of ore. For that reason, the production has not quite fulfilled expectations although larger than in any previous year. The Kristiansand plant in Norway is intact according to fairly recent information."

The company treated 830,254 tons of ore and produced 22,904.5 tons of matte containing 12,048.5 tons of nickel and 6,382.6 tons of copper. Metals recovered per ton treated were 29.02 pounds of nickel and 15.38 pounds of copper. Metallurgical losses per ton treated were 2.90 pounds of nickel and 2.49 pounds of copper. The indicated grade of ore hoisted was 1.59 per cent nickel and 0.89 per cent copper; the sampled grade of ore hoisted was 1.57 per cent nickel and 0.88 per cent copper. Matte produced by the company was refined by the International Nickel Company of Canada Ltd.

Deloro Smelting and Refining Co. Ltd.—The company's plant located at Deloro, Ontario, was in continuous operation throughout 1944. A relatively small tonnage of Ontario silver-cobalt ores was treated during the year under review. A considerable quantity of silver was recovered from these ores. Refined arsenic was produced from silver-cobalt ores and from crude arsenic received from a Quebec gold mine. The greater part of the company's output in 1944 represented cobalt oxide, cobalt metal, cobalt alloys and cobalt salts produced from foreign material treated in the Deloro plant. A small tonnage of silver-cobalt ores was shipped for export from the United States Government stock pile located at Deloro, Ontario.

Dominion Magnesium Ltd.—Magnesium metal in the form of ingots, alloys, etc., was produced by the company throughout 1944 at Haley, Ontario. The metal was recovered from crude dolomite rock quarried locally and the ferrosilicon process was employed. Operations at the plant were conducted by the company for the Dominion Government without fee or profit as a war effort and were under the direct supervision of the Department of Munitions and Supply.

Hudson Bay Mining & Smelting Co. Limited.—The annual report of the company stated:

"Operation of the copper smelter continued to be satisfactory and all available material was smelted. The tonnage of pay charge treated was somewhat less than in 1943 and amounted to 468,496 tons. Gold and silver production was lower than it has been for several years, but copper production was higher than in any year except 1943. The company smelted 408,554 tons of its own ores and concentrates and 59,034 tons of custom concentrates. After allowing for metals due on account of custom concentrates, the company shipped for its own account 145,441 ounces of gold, 2,017,443 ounces of silver, 86,481,746 pounds of copper and 136,299 pounds of selenium. In addition to smelting the usual custom concentrates from Sherritt Gordon Mines Limited the company treated copper concentrates shipped from Emergency Metals Limited during the latter half of the year.

"The tonnage of zinc concentrates treated during the year was the highest on record amounting to 161,314 tons from which 102,458,756 pounds of slab zinc were produced; there were produced 68,071 tons of zinc plant residue, which were added to stockpile, where there are now 531,000 tons in storage.

"In 1939 your company concluded contracts with the British Ministry of Supply covering substantially the exportable surplus of both its copper and zinc production. Effective January 31, 1945, the British Government terminated the copper contract, the zinc contract still remaining in effect. Previous to the war, the greater part of our copper and zinc production was sold in the British market, but to what extent this market will absorb our production in the post-war period is an open question. For the present, the United States Government is purchasing the exportable surplus of our copper production. Labour shortage restricted mine development and exploration work.

"The cadmium plant treated precipitates from the zinc purification plant and produced a total of 140,560 pounds of metallic cadmium, having an average purity of 99.9834 per cent.

"The average number of employees at Flin Flon during 1944 was 2,074 as compared with 2,217 in 1943; a total of 1,169 employees have joined the armed services since the start of the war. . . ."

The Consolidated Mining and Smelting Company of Canada Limited.—The company reported:

"The year 1944 was marked by labour shortages and labour unrest throughout the operations. This situation, together with increased and overdue development work and larger-scale backfilling operations, caused a substantial reduction in metal output. . . . Some improvement in costs and tonnages and particularly in regard to labour was evident towards the end of the year, and this improvement should continue through the early months of 1945. . . . Refined lead tonnage was 143,556 compared with 224,493 in 1943, and bar zinc production was 117,365 tons compared with 152,299 in 1943. The silver output was about 60 per cent of that in 1943. The antimony plant was shut down in September largely as a labour economy measure. Chemical and fertilizer operations broke all previous tonnage records. Sulphuric acid output in terms of 100 per cent acid was 331,718 tons against 269,394 in 1943, and the total fertilizer tonnage for the year was 327,232 compared with 272,503 in 1943. The lower tonnage of lead and zinc concentrates from Sullivan mine tended to reduce sulphuric acid production and it was necessary to ship and roast a large tonnage of Sullivan iron tailings to supply some of the acid required for fertilizer.

"Employees on the military rolls at the year end totalled 2,359; the number of employees, exclusive of those on military rolls, at the end of 1944 totalled 6,437.

"The company bears the full cost of employees' pensions, which are administered by the Pension Fund Society. At Trail, Local 330 of the International Union of Mine, Mill and Smelterworkers (C.I.O.) was certified as the bargaining representatives for the days pay workers on the 2nd June 1944, and negotiations were commenced, resulting in an agreement being signed in January 1945."

CHAPTER SEVEN

THE COAL MINING, COKE, NATURAL GAS AND PETROLEUM INDUSTRIES
(Fuels) IN CANADA

The Coal Mining Industry in Canada.

The Coke and Gas Industry in Canada.

The Peat Industry in Canada is included under non-metals, chapter 8.

The Petroleum Industry in Canada.

1. Production of Crude Petroleum.
2. Production of Petroleum Products.

NOTE:—In order to correlate data regarding fuels in Canada, this chapter has been prepared to include statistics of the coal, natural gas, and petroleum industries. This survey presents information regarding these industries as a whole, dealing principally with the mineral industry, although supplementary data are shown for closely allied manufacturing operations.

The Bureau issues an annual report on Coal Statistics for Canada which may be referred to for complete details of the Coal Mining Industry.

THE COAL MINING INDUSTRY

Production of coal in Canada in 1944 totalled 17,026,499 tons valued at \$70,433,169, a decrease of 4.6 per cent from the 1943 production of 17,859,057 tons. Of the total production for the year, Alberta contributed 7,428,708 tons; Nova Scotia 5,745,671 tons; British Columbia 2,134,231 tons; Saskatchewan 1,372,766 tons, and New Brunswick 345,123 tons.

Exports of Canadian coal during 1944 amounted to 1,010,240 tons compared with 1,110,101 tons in 1943.

Imports of coal into Canada in 1944 totalled 28,926,925 tons, a slight increase over the 28,852,654 tons imported in the previous year. The coal imported during the year included 24,513,527 tons of bituminous coal and 4,194,716 tons of anthracite coal from the United States, and 218,511 tons of anthracite coal from Great Britain.

The average number of employees at coal mines in Canada during 1944 was 25,234 compared with 24,866 in 1943. Salaries and wages paid during the year totalled \$55,020,537 compared with \$47,291,919 in 1943. The 1944 wages include retroactive payments of the dollar a day wage increase which apply to the months of November and December 1943, but which were paid in 1944.

Coal made available for consumption in 1944 amounted to 44,943,184 tons, a decrease of 1.4 per cent from the tonnage made available in the previous year. These figures do not represent the quantity consumed during the year but are the actual tonnages of new coal made available for use, and are calculated by subtracting the exports from the production and adding the imports.

In addition to coal consumption, Canada's fuel requirements include coke, natural and artificial gas, fuel oil, wood and electricity, all of which are used for both industrial and domestic purposes.

Table 207.—Employees, Salaries and Wages in the Coal Mines of Canada, by Provinces, 1944

Province	Average number of employees				Salaries and wages		
	Salaried employees		Daily wage-earners		Total	Salaries	Wages
	Male	Female	Surface	Under-ground			
						\$	\$
Nova Scotia.....	472	157	1,911	10,188	12,728	1,447,796	*28,226,186
New Brunswick.....	45	10	251	619	925	120,677	1,328,885
Manitoba.....							
Saskatchewan.....	46	8	263	338	655	101,824	897,011
Alberta.....	646	62	2,088	5,577	8,373	1,716,624	15,517,427
British Columbia.....	234	31	743	1,907	2,915	707,684	4,956,423
Canada.....	1,443	268	5,256	18,629	25,596	4,094,605	50,925,932

* Includes retroactive payments of the dollar a day wage increase applying to the months of November and December 1943, but which were paid in 1944.

Note:—Table 208 was compiled from *monthly* returns of operators and show the average employment at coal mines. Salaried employees shown in Table 207 are compiled from *annual* returns and include 362 persons who are not employed in or about the mines and are not reported on the monthly returns.

Table 208.—Employment and Days' Work Done, by Months, at Coal Mines in Canada, 1944, with Comparative Totals for 1943

Month	Number of employees			Days' work done		
	Surface	Under-ground	Total	Surface	Under-ground	Total
January.....	6,636	21,071	27,707	154,351	454,929	609,280
February.....	6,380	20,677	27,057	143,535	428,215	571,750
March.....	6,094	20,120	26,214	149,251	452,437	601,688
April.....	5,845	19,098	24,943	129,780	385,674	515,454
May.....	5,839	18,514	24,353	138,456	394,628	533,084
June.....	5,838	18,207	24,045	136,894	392,832	529,726
July.....	5,891	17,727	23,618	131,353	360,124	491,477
August.....	6,026	17,674	23,700	144,385	402,916	547,301
September.....	5,961	18,461	24,422	139,545	398,885	538,430
October.....	6,013	18,757	24,770	141,452	416,909	558,361
November.....	6,210	19,779	25,989	147,144	438,847	585,991
December.....	6,271	19,684	25,955	140,351	401,132	541,483
Total for 1944.....				1,696,497	4,927,528	6,624,025
Total for 1943.....				1,711,767	4,967,789	6,679,556

Table 209.—Output of Coal in Canada, by Grades, 1918-1944

Calendar year	Anthracite		Bituminous		Sub-Bituminous*		Lignite		Total	
	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value	Short tons	Value
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
1918	115,405		11,636,190				3,226,331		14,977,926	55,192,896
1919	85,579		10,892,046				2,941,471		13,919,096	55,622,670
1920	127,513		13,122,924				3,696,327		16,946,764	82,496,538
1921	96,964	330,699	11,680,477	58,848,444			3,280,052	13,272,513	15,057,493	72,451,656
1922	40,417	122,538	11,630,488	53,348,507			3,486,526	12,047,452	15,157,431	65,518,497
1923	107	322	12,941,877	58,478,670	466,492	1,399,424	3,582,095	12,180,570	16,990,571	72,058,986
1924			9,485,732	40,662,894	590,168	1,761,086	3,564,297	11,170,008	13,638,197	53,593,988
1925			8,959,607	36,793,501	570,654	1,731,267	3,624,707	10,737,183	13,134,968	49,261,951
1926			12,393,079	48,153,572	489,736	1,458,116	3,595,316	10,263,406	16,478,131	59,875,094
1927			13,006,996	49,385,818	596,155	1,784,973	3,823,710	10,696,672	17,426,861	61,867,463
1928			12,971,744	50,584,108	740,496	2,076,212	3,852,053	11,097,513	17,564,293	63,757,833
1929			12,859,822	49,995,261	668,702	1,908,954	3,968,033	11,160,955	17,496,557	63,065,170
1930			10,824,839	41,789,061	603,358	1,705,236	3,453,127	9,355,451	14,881,324	52,849,748
1931			8,861,360	33,165,730	471,343	1,211,197	2,910,508	6,830,755	12,243,211	41,207,682
1932			7,714,279	28,073,744	560,902	1,329,316	3,463,732	7,714,635	11,738,913	37,117,695
1933			7,979,283	27,737,150	554,118	1,274,017	3,369,943	6,892,795	11,903,344	35,923,962
1934			10,058,782	34,556,274	537,508	1,256,936	3,213,903	6,432,732	13,810,193	42,045,942
1935			9,748,841	33,150,781	566,425	1,410,926	3,572,740	7,401,403	13,888,006	41,963,110
1936			10,796,135	36,256,347	566,235	1,432,741	3,866,812	8,102,846	15,229,182	45,791,934
1937			10,324,379	39,661,259	506,260	1,314,196	3,695,315	7,776,593	15,835,954	48,752,045
1938			10,329,782	35,403,781	488,915	1,269,131	3,476,021	7,309,259	14,294,718	43,982,171
1939			11,769,296	40,119,905	512,101	1,323,401	3,411,301	7,233,684	15,692,698	48,676,990
1940			13,333,037	45,350,950	598,686	1,569,771	3,635,161	7,755,123	17,566,884	54,675,844
1941			13,603,307	47,391,274	585,453	1,593,549	4,037,161	9,074,807	18,225,921	58,059,630
1942			13,616,215	49,730,504	733,547	2,100,889	4,515,268	11,066,188	18,865,030	62,897,581
1943			11,985,253	47,353,853	792,252	2,399,289	5,081,552	13,124,407	17,859,057	62,877,549
1944			11,776,439	54,906,592	729,427	2,537,002	4,520,633	12,989,575	17,026,499	70,433,169

* Not separately reported prior to 1923.

Table 210.—Output and Value of Coal in Canada, by Kinds and Provinces, 1943 and 1944

(Short tons)

Province	1943			1944		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
			\$			\$
NOVA SCOTIA (Bituminous).....	40	6,103,085	27,121,861	37	5,745,671	30,728,535
NEW BRUNSWICK (Bituminous).....	39	372,873	1,641,069	32	345,123	1,845,277
MANITOBA (Lignite).....	1	999	2,964			
SASKATCHEWAN (Lignite).....	(*) 80	1,665,972	2,432,249	(*) 66	1,372,766	2,034,914
ALBERTA—						
Bituminous.....	14	3,469,893	10,942,203	14	3,551,414	13,323,274
Sub-bituminous.....	12	792,252	2,399,289	12	729,427	2,537,002
Lignite.....	159	3,414,581	10,689,194	158	3,147,807	10,954,661
Total.....	† 185	7,676,726	24,030,686	† 184	7,428,708	26,814,937
BRITISH COLUMBIA (Bituminous).....	30	2,039,402	7,648,720	31	2,134,231	9,009,506
YUKON (Bituminous).....						
CANADA—						
Bituminous.....	123	11,985,253	47,353,853	114	11,776,439	54,906,592
Sub-bituminous.....	12	792,252	2,399,289	12	729,427	2,537,002
Lignite.....	240	5,081,552	13,124,407	224	4,520,633	12,989,575
Total.....	375	17,859,057	62,877,549	350	17,026,499	70,433,169

(*) Exclusive of 19 small mines in operation during part of 1943 and 25 small mines operating during part of 1944.

† Exclusive of 19 small mines operated under special permits in 1943 and 19 small mines in 1944.

THE NATURAL GAS INDUSTRY

Production of natural gas in Canada during 1944 totalled 45,067,158 thousand cubic feet valued at \$11,422,541, compared with 44,276,216 thousand cubic feet worth \$13,159,418 in 1943. Of the 1944 output, 37,161,570 thousand cubic feet valued at \$6,339,817 originated in the province of Alberta, 7,082,508 thousand cubic feet valued at \$4,694,097 in Ontario and the balance in New Brunswick, Saskatchewan and Northwest Territories.

During the year under review, there were 211 firms reporting natural gas production from a total of 3,621 active wells. Employees numbered 1,810 and \$2,885,654 were distributed in salaries and wages. The cost of fuel and electricity used totalled \$188,003 and process supplies consumed amounted to \$13,149.

The following information was abstracted from a report on Natural Gas in 1944 as prepared by the Bureau of Mines, Ottawa:

"Natural gas occurs in most provinces. It is produced commercially in abundance in Alberta and Ontario, and in smaller quantities in New Brunswick, Saskatchewan and Quebec.

"Natural gas occurs in sedimentary rocks, either in limestones, usually dolomitic and cavernous, or in sands and sandstones. The principal Canadian sources are in rocks of Palaeozoic age, the chief sources of supply being the Turner Valley field in Alberta, fields in Kent and Haldimand counties in Ontario, and the Stoney Creek field in New Brunswick. Natural gas is also produced in Alberta and Saskatchewan in considerable quantity from Cretaceous sandstones. The foregoing productive areas have been generally defined for some time. No outstanding new finds contributed to the production in 1944, but at the close of the year what appears to be an important discovery was made at Jumping Pound, 20 miles west of Calgary, in Alberta.

"In New Brunswick, the Stony Creek field continued to supply Moncton and Hillsborough and certain localities in Albert and Westmorland counties with natural gas. Three new wells were drilled, two were deepened, and four were abandoned. Total new production measured in terms of initial production amounted to 1,636 M cubic feet. The geophysical survey of 1943 was continued into 1944.

"In Quebec, natural gas is produced in small quantities at several shallow wells along the St. Lawrence River and is used locally.

"In Ontario, drilling was principally active in Haldimand county, where new wells were brought into production in Walpole, Oneida, and South Cayuga townships, and in Norfolk county, notably in Townsend township. These wells were mostly in proven territory. New ground was developed in Zone township, Kent county, where a number of producing wells were completed just north of the old Bothwell oilfield. Very little drilling in unproved areas occurred elsewhere and no results were recorded.

"In Saskatchewan, the eastern part of the Lloydminster field supplied the town of Lloydminster from 5 wells. In the Kamsack area 7 wells were drilled, 2 of which got production. Kamsack Gas and Oil Company replaced its 2-inch line with a 5-inch line, which was connected to 11 shallow wells. Three other small wells supplied the needs of farmers. Other wells were being drilled in both these areas. Geological and geophysical work was again being done and drilling was done in many localities.

"In Alberta, the Turner Valley field furnished fuel for the operations in the field itself; to the cities and districts of Calgary and Lethbridge; and raw material to the nitrogen plant in Calgary. For several years the drilling of gas wells in this field has been unnecessary, as the gas is largely derived from the production of petroleum in which the gas plays a vital role. The gas/oil ratio of many of these oil wells, particularly in the southern part of the field, where effective measures of conservation were applied too late in their life, has risen so much that in some cases they have had to be reclassified as gas wells, thus augmenting the reserve of gas.

Production of Alberta, by Fields (*)

	1943	1944
	M cu. ft.	M cu. ft.
TURNER VALLEY—		
Shallow wells.....	45,789	42,840
Limestone gas wells.....	16,344,113	11,396,668
Limestone oil wells.....	27,850,290	29,947,394
Less gas repressured by British American Oil.....		9,374
	44,240,192	41,377,528
Foremost.....	298,782	38,223
Viking.....	1,742,686	1,858,585
Kinsella.....	4,582,218	5,172,263
Medicine Hat.....	2,998,155	3,227,006
Redcliff.....	682,158	822,282
Other fields.....	564,509	768,389
	55,108,700	53,264,281

(*) Information from Petroleum and Natural Gas Conservation Board.

"These figures are considerably larger than those of the Dominion Bureau of Statistics, which are for consumption only. Production, therefore, still remained much in excess of consumption, although the waste of gas in Turner Valley was further reduced by over 12 per cent. Ever since Royalite No. 4 well demonstrated the existence of a big gas field in Turner Valley the need for preventing this waste has been recognized, but technical and economic difficulties arose. Steady progress has been made in recent years, however. The Provincial Government, during the year, established the Natural Gas Utilities Board to put into effect recommendations made in the report of Thomas R. Weymouth in 1943. At the end of 1943, Madison Natural Gas Company was formed and this company, together with British American Oil Company, has been entrusted by the Board with the execution of the plan, which involves dismantling one of the existing natural gasoline plants and portioning the supply of gas among the remaining plants. It is hoped that when the scheme is fully working, the only gas wasted will be small quantities from oil wells producing intermittently. All gas produced and not required is to be returned underground either to the Turner Valley gas-cap or to the Bow Island field. Three wells are to be used as input wells in the south end of Turner Valley and four in the north. It is estimated that the scheme will add 60 per cent to the life of the field as a gas producer. The experiments in repressuring through Foundation well in the south end were discontinued at the beginning of the year and a start was made on the new scheme in December using the Carleton and Pacalta wells which were repressured 1 and 2 days respectively.

"Two important outlets exist for natural gas from Turner Valley, apart from its use as fuel. The plant of Alberta Nitrogen Company near Calgary, built by the Consolidated Mining and Smelting Company of Canada to make military explosives and using natural gas and electric power, was found to have a capacity in excess of the demand for explosives, and owing to a shortage of commercial fertilizer, this has resulted in its being used in part for the manufacture of fertilizers for home and foreign markets. The other outlet is as a source of iso-butane, which is processed in the alkylation plant together with butylene obtained from Imperial Oil and British American refineries. The iso-butane is recovered in the absorption plants with most of the normal butane, but the proportion of the latter is insufficient to render an isomerization plant economical and it goes into the motor gasoline.

"The gas fields at Viking, 80 miles southeast of Edmonton, and at Kinsella farther east, supply the Edmonton area, the Kinsella field being the principal source of supply. Two wells were completed in the field in 1944 and in December 17 wells were producing at Viking and 14 at Kinsella. In December 39 gas wells were producing in the Medicine Hat field and 13 in the Redcliff field."

Table 211.—Production of Natural Gas in Canada, by Provinces, 1935-1944

Year	New Brunswick		Ontario		Manitoba		Alberta	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$		\$
1935.....	615,454	303,886	8,158,825	4,938,084	600	180	16,060,349	4,113,436
1936.....	606,246	298,819	10,006,743	6,052,294	600	180	17,407,820	4,376,720
1937.....	576,671	283,922	10,746,334	6,588,798	600	180	20,955,506	4,766,437
1938.....	577,492	284,689	10,952,806	6,460,764	600	180	21,822,108	4,807,346
1939.....	606,382	292,403	11,966,581	7,261,928	600	180	22,513,660	4,915,821
1940.....	616,041	300,543	13,053,403	7,745,834	600	180	27,459,808	4,923,469
1941.....	653,542	317,437	11,828,703	7,140,130	.....	.....	30,905,440	5,175,364
1942.....	619,380	299,688	10,476,770	6,809,901	.....	.....	34,482,585	6,146,146
1943.....	675,029	327,787	7,914,408	6,543,913	.....	.....	35,569,078	6,241,815
1944.....	702,464	341,636	7,082,508	4,694,097	.....	.....	37,161,570	6,339,817

Year	Saskatchewan		Northwest Territories		Canada	
	M cu. ft.	Value	M cu. ft.	Value	M cu. ft.	Value
		\$		\$		\$
1935.....	75,558	7,555	.....	.....	24,910,786	9,363,141
1936.....	90,839	33,985	1,100	245	28,113,348	10,762,243
1937.....	100,380	35,130	1,500	335	32,380,991	11,674,802
1938.....	90,285	34,136	1,500	335	33,444,791	11,587,450
1939.....	96,423	36,640	1,500	335	35,185,146	12,507,307
1940.....	100,773	30,232	1,500	335	41,232,125	13,000,593
1941.....	106,168	31,850	1,500	335	43,495,353	12,665,116
1942.....	117,124	45,585	1,500	335	45,697,359	13,301,655
1943.....	116,201	45,568	1,500	335	44,276,216	13,159,418
1944.....	119,116	46,656	1,500	335	45,067,158	11,422,541

Table 212.—Production (a) of Natural Gas in Canada, by Months, 1944

	New Brunswick	Ontario	Saskatchewan	Alberta	Canada
	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.	M cu. ft.
January.....	86,621	897,194	15,247	4,156,349	5,155,411
February.....	75,862	831,216	17,281	4,127,723	5,052,082
March.....	74,538	744,622	16,038	4,146,315	4,981,513
April.....	73,618	771,342	7,402	3,190,820	4,043,182
May.....	60,286	462,018	5,226	2,577,088	3,104,618
June.....	47,094	413,406	4,742	2,212,626	2,677,868
July.....	35,988	322,641	3,027	2,062,633	(b) 2,424,789
August.....	27,819	318,023	4,149	2,043,271	(b) 2,393,762
September.....	33,909	382,054	5,381	2,212,868	(b) 2,634,712
October.....	48,580	469,557	7,576	2,527,982	3,053,695
November.....	68,554	656,026	14,973	3,658,539	4,398,092
December.....	69,595	814,409	18,074	4,245,356	5,147,434
Total.....	702,464	7,082,508	119,116	37,161,570	45,067,153

(a) Includes production from Fort Norman, Northwest Territories.

(b) Sales and consumption by producers.

Table 213.—Natural Gas Production in Ontario, by Fields, 1943 and 1944

County	Field	1943	1944
		M cu. ft.	M cu. ft.
Essex.....	Kingsville.....	28,732	52,949
	Tilbury, Romney and Raleigh.	2,445,565	2,108,473
	Declute.....	475,567	362,310
	Dover.....	220,133	181,211
Kent.....	Chatham.....	313,231	336,852
	Zone.....		277,920
	Dawn.....		
Lambton.....	Oil Springs.....	1,102,072	685,845
Middlesex.....	Mosa.....		
Oxford.....	South Norwich.....	3,730	1,065
Elgin.....	Brownsville (*).....	51,718	37,391
	Bayham.....	7,082	22,374
Elgin.....	Bayham.....	87,091	39,652
	Malahide.....	240,399	242,806
Norfolk.....	Norfolk.....		
Lincoln.....	Lincoln.....		
Haldimand.....	Haldimand.....	2,470,967	2,267,075
Wentworth.....	Wentworth.....		
Welland.....	Welland.....	296,016	311,417
Brant.....	Onondaga, Brantford and Tuscarora.....	98,105	81,168
Prince Edward.....	Hallowell.....	14,000	14,000
Wells in surface drift.....	Harwich and Howard Tps.....	60,000	60,000
Private wells.....			
Total Produced.....		7,914,408	7,082,508

(*) { Dereham Tp..... 27,108 M cu. ft.; Bayham Tp..... 10,283 M cu. ft.—1944
Dereham Tp..... 36,710 M cu. ft.; Bayham Tp..... 15,008 M cu. ft.—1943

Table 214.—Sales Only of Manufactured and Natural Gas in Canada, 1943 and 1944

	1943			1944		
	Number of Customers	Quantity sold M cu. ft.	Revenue from sales \$	Number of customers	Quantity sold M cu. ft.	Revenue from sales \$
MANUFACTURED GAS—						
Domestic.....	473,992	10,711,654	12,297,425	488,653	12,098,351	13,334,020
House heating.....	5,289	1,267,416	695,936	5,864	1,333,339	731,868
Industrial.....	3,138	5,543,653	3,091,942	3,236	5,786,717	3,435,914
Commercial.....	26,789	3,492,052	3,106,550	29,056	3,671,522	3,253,155
Miscellaneous.....	115	69,471	65,929	116	47,350	46,562
Total.....	509,323	21,084,246	19,257,782	526,925	22,937,279	20,801,519
NATURAL GAS—						
Domestic.....	182,650	14,480,386	7,048,029	186,269	14,565,801	7,081,369
Industrial.....	1,130	7,589,289	1,970,650	1,122	6,144,211	1,851,076
Commercial.....	10,684	7,035,941	1,892,627	10,932	7,410,938	1,888,976
Miscellaneous.....	509	564,635	41,297	506	1,062,106	47,864
Total.....	194,973	29,670,251	10,952,603	198,829	29,183,056	10,869,285
Total—All Gas.....	704,296	50,754,497	30,210,385	725,754	52,120,335	31,670,804

NOTE.—Sales figures represent sales by distributing companies to consumers. Amounts used by producers are not included.

Table 215.—Number of Gas Wells in Canada, by Provinces, 1942-1944

	New Brunswick	Ontario	Manitoba	Saskatchewan	Alberta	Canada
Productive wells at beginning of year.....1942	40	3,277		3	104	3,424
.....1943	42	3,344		3	108	3,497
.....1944	43	3,346		3	116	3,508
Number of productive wells drilled.....1942	2	148			4	154
.....1943	5	149			10	164
.....1944	1	194			4	199
Number of dry wells drilled.....1942		144				144
.....1943		105				105
.....1944		116				116
Number of wells abandoned.....1942		74				74
.....1943	4	117			2	123
.....1944	4	193			1	198
Productive wells at end of year.....1942	42	3,344		3	108	3,497
.....1943	43	3,346		3	116	3,508
.....1944	40	3,397		3	119	3,509

Table 216.—Natural Gas Wells in Ontario by Townships, 1943 and 1944

Township	1943				1944			
	No. of producing wells in operation Dec. 31, 1942	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year	No. of producing wells in operation Dec. 31, 1943	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Aldborough.....							1	
Anderson.....								
Bayham.....	53	9			37	11		
Bertie.....	150		1	8	158	1	1	8
Beverly.....								1
Binbrook.....	40				40	10		
Brant.....				7	7			
Brantford.....	2				2			
Brooke.....							1	
Caistor.....	71	3	1	8	76	4		7
Camden Gore.....				1			3	1
Canboro.....	147	5		1	144	7		1
Cayuga North.....	191	12	5	21	195	12	7	17
Cayuga South.....	55		6	14	68	1	12	21
Charlotteville.....	13		3	2	15		1	
Chatham.....	20		1	1	21		3	4
Colchester.....								
Crowland.....	26				26	1		1
Culross.....								
Dawn.....	30	2	2	3	30	4	1	1
Delaware.....			1					
Delhi Village.....	3				3			
Dereham.....	18		1		6	6		
Dorchester North.....								
Dover.....	21	1			17	1		
Dunn.....	50	7	2		43	1		5
Dunwich.....								
Enniskillen.....	3				2	1		
Gainsboro.....	15	3			12	1		
Glanford.....	10				10	2		
Gosfield South.....	24				24			
Hallowell.....				1	1	15		
Harwich.....							1	
Hobson.....							1	
Houghton.....	2				4			
Humberstone.....	82	5			77	2	1	3
Kincardine.....								
Malahide.....	65	19	5		50	31	4	
Malden.....						1	2	
Marysburg.....	3				3			
Mersea.....	3							
Middleton.....	48	5			46	12	3	1
Mosa.....		1					1	
Moulton.....	97			8	105	6	2	4
Nassageva.....			1					
Norwich South.....	1		1		1			1
Notawasaga.....						1	1	
Oneida.....	90	7	13	32	114	3	17	12
Onondaga.....	32	3			24	7		
Oxford.....								
Oxford North.....								
Oxford West.....								
Port Dover Village.....	3				3			
Port Rowan.....	4				4			
Rainham.....	322	3	1	1	318	13	6	10
Raleigh.....	58		1		57	5	1	
Romney.....	141		1	1	139	3		
Sarnia.....								
Seneca.....	157	2			152	10	3	
Sherbrooke.....	18		1		14	3	1	2
Sombra.....			2					
Southwold.....								
Tilbury East.....	124		2	2	125	6		
Townsend.....	11		14	10	21		14	18
Tuscarora.....	73	6	3	3	70	1	4	
Wainfleet.....	32	1	5	2	34	4	1	9
Walpole.....	495	23	13	17	493	4	7	36
Walsingham North.....			2		8			
Walsingham South.....	23				14			
Westminster.....			3				2	
Willoughby.....	53				53	1		
Windham.....	21		2		21		2	1
Woodhouse.....	78		6	2	87		5	5
Yarmouth.....								
Zone.....			5	4	3		7	14
Private wells.....	300				300			11
Surface wells.....	69				69			
Total.....	3,344	117	105	149	3,346	193	116	194

Table 217.—Natural Gas Pipeline Mileage in Canada, 1943 and 1944

Province	Actual Miles of Mains				Miles of Equivalent 3" Mains			
	Gathering and transmission		Distribution		Gathering and transmission		Distribution	
	1943	1944	1943	1944	1943	1944	1943	1944
New Brunswick.....	20	20	65	65	36	36	73	73
Ontario.....	2,316	2,325	2,530	2,332	3,886	3,901	2,745	2,578
Saskatchewan.....			6	6			4	4
Alberta.....	697	692	628	626	2,261	2,250	1,178	1,184
Canada.....	3,033	3,037	3,229	3,079	6,183	6,187	4,000	3,839

Table 218.—Principal Statistics of the Natural Gas Industry in Canada, 1944

	New Brunswick and Saskatchewan	Ontario	Alberta	Canada
Number of firms.....	3	186	22	211
Number of wells.....	44	3,458	119	3,621
Number of employees—On salary.....	24	666	298	988
On wages.....	56	568	198	822
Total.....	80	1,234	496	1,810
Salaries and wages—Salaries..... \$	42,978	1,032,262	619,273	1,744,513
Wages..... \$	87,174	728,709	325,258	1,141,141
Total..... \$	130,152	1,810,971	944,531	2,885,654
Selling value of products (gross)..... \$	407,376	4,694,097	4,670,884	9,772,357
Cost of fuel and electricity..... \$	13,988	133,987	40,028	188,003
Process supplies used..... \$	1,200	10,949	1,000	13,149
Selling value of products (net)..... \$	392,188	4,549,161	4,629,856	9,571,205

NOTE.—The small estimated production of natural gas in Northwest Territories represents the quantity used by one producer—no general statistics relating to its use are available.

Table 219.—Employees, Salaries and Wages in the Natural Gas Industry in Canada, by Provinces, 1943 and 1944

Province	Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1943					\$	\$	\$
New Brunswick.....	10	11	64	85	38,678	93,940	132,618
Ontario.....	520	142	533	1,193	1,077,628	656,540	1,734,168
Saskatchewan.....	5	1		6	5,500		5,500
Alberta.....	234	60	302	596	606,512	367,716	974,228
Canada.....	769	214	899	1,882	1,728,318	1,118,196	2,846,514
1944							
New Brunswick.....	9	10	56	75	37,311	87,174	124,485
Ontario.....	516	150	568	1,234	1,082,262	728,709	1,810,971
Saskatchewan.....	4	1		5	5,667		5,667
Alberta.....	237	61	198	496	619,273	325,258	944,531
Canada.....	766	222	822	1,810	1,744,513	1,141,141	2,885,654

Table 220.—Wage-Earners, by Months, 1943 and 1944 (On the last work-day of each month)

Month	1943			1944		
	Male	Female	Total	Male	Female	Total
January.....	678	14	692	685	12	697
February.....	678	10	688	681	14	695
March.....	675	15	690	678	12	690
April.....	687	15	702	709	13	722
May.....	784	14	798	761	13	774
June.....	862	16	878	830	16	846
July.....	945	19	964	945	13	958
August.....	932	18	950	958	13	971
September.....	898	20	918	927	14	941
October.....	824	21	845	896	12	908
November.....	776	19	795	819	10	829
December.....	708	16	724	724	11	735
Average.....	883	16	899	808	14	822

THE PETROLEUM INDUSTRY IN CANADA

Including (1) Production of Crude Petroleum, and (2) Petroleum Products

(1) Production of Crude Petroleum

Production of crude petroleum and natural gasoline in Canada during 1944 totalled 10,099,404 barrels valued at \$15,429,900 compared with 10,052,302 barrels worth \$16,470,417 in 1943. Of the 1944 output, 8,727,366 barrels originated in Alberta; 1,223,675 barrels in Northwest Territories; 125,067 barrels in Ontario and 23,296 barrels in New Brunswick. The net value of producers' sales of crude petroleum in Canada during 1944 was estimated at \$14,575,563.

The industry in 1944 provided employment for 2,547 persons and distributed \$5,814,676 in salaries and wages; fuel and electricity used during the year totalled \$1,000,484 and the cost of process supplies consumed amounted to \$242,311. Firms active in 1944 numbered 224 and wells under operation totalled 2,264. The footage drilled, under contract, for petroleum in 1944 amounted to 330,411 feet, of which 12,410 feet were completed by cable drilling, 2,000 feet by diamond drilling, and 316,001 feet by rotary drills. Included in the total footage drilled by contractors were 312,424 feet in Alberta; 10,305 in Saskatchewan; 4,289 in Ontario, and 3,393 in Nova Scotia. In addition to the drilling completed by contractors, there was a considerable footage drilled by oil companies with their own personnel and equipment.

The following is an excerpt from a review on Petroleum in 1944 as prepared by the Bureau of Mines, Ottawa:

"Crude petroleum is produced in Canada from wells in Alberta, the Northwest Territories, Ontario and New Brunswick. The total production in 1944 was in excess of 10,000,000 barrels, 89 per cent of which came from Alberta. The Turner Valley field in that province contributed 82.5 per cent of the total Canadian output as compared with 95 per cent in 1943. This percentage decrease can be traced partly to more than a twofold increase from other fields in Alberta, and partly to a marked increase in production in the Norman field, Northwest Territories. By far the greater part of Canada's requirements of crude petroleum is imported.

"In 1944 there was a record amount of exploration and drilling in Alberta and Saskatchewan in search of new sources of petroleum. No discoveries of oil were made in Saskatchewan, but in Alberta several new producers were added to the list.

"The Rundle (Madison) limestone of Palaeozoic age is the source of almost the entire production of petroleum in the Turner Valley field. Until June, 1936, production in the field came almost entirely from the wells in the gas cap and was termed "naphtha", an unstable natural gasoline. Since then, however, development has been diverted toward the western deep-lying belt of the limestone, the existence of which had already been indicated by marginal wells. Production comes from the same porous horizons that yield the naphtha in the gas cap, and the gravity of the oil increases progressively down the dip slope from 45° A.P.I. to 38° A.P.I., beyond which lies edge water. (By way of explanation it should be noted that the specific gravity of a heavy crude oil is about 10° A.P.I.; thus, as the specific gravity decreases, the degrees A.P.I. increase. The letters A.P.I. following the degrees mean that the specific gravity is measured in terms of the American Petroleum Institute scale).

"In 1944 drilling in Turner Valley was largely in the central part of the field, which had formerly attracted little attention owing to its supposed indifferent yield. There was a steady development of the northern section of the field. In the central region drilling was encouraged by financial aid from Wartime Oils, Limited, a Crown company, formed in 1943, which lends

money to the operators on the basis of a small royalty and low interest, to be repaid out of production. Twenty producing wells were completed under this scheme in 1944, three of which were better than average producers. Twenty-one other wells were also completed in Turner Valley, two of which are near the southern end and fourteen are north of Sheep River. Neither the northern nor the southern limit of the field has been fully defined as yet by drilling.

"Activities in the northern end of Turner Valley were stimulated through the finding of oil in wells on the east side at depths below the known water level on the west side. All wells flow naturally, and, with one exception that turned out to be a water flow, those that have ceased to be oil wells have passed into the category of gas wells.

"The pipe-line charge for pumping oil from Turner Valley to the Imperial Oil Refinery at Calgary was reduced on May 1, 1944, from $9\frac{1}{2}$ cents a barrel to $7\frac{1}{2}$ cents, thus bringing the price of 41° A.P.I. crude up to \$1.68 a barrel, in tanks at the well. The differential of 2 cents per degree A.P.I. above and below 41° A.P.I. remained unchanged.

"South of Conrad on the Canadian Pacific Railway an oil of 25.4° A.P.I. gravity was discovered in the Ellis sand at 3,050 feet. This area is 7 miles west of the old Skiff field, where heavier oil was struck in 1927. The old Red Coulee field 7 miles west of Coutts on the International boundary, which produced 329,000 barrels in the past 15 years, was abandoned in 1944.

"Extensive test drilling, usually following geological and geophysical surveys, was continued on the southern plains of Alberta. Results of special interest were obtained at a well in the Princess field, 120 miles east of Calgary. First developed in 1939, this well yielded a total of 30,000 barrels of 27° A.P.I. oil in 1941 and 1942 from just above the Palaeozoic rocks. Production proved difficult, however, owing to high pressure gas and to water. The well was 'spudded in' the latter part of July, 1944, and rich lubricating oil was encountered at 3,983 feet in the Jefferson lime of Middle Devonian. It was completed in September and produced over 12,000 barrels by the end of the year. It is the first discovery of Devonian oil in commercial quantity in the plains of Alberta.

"A number of test wells were being drilled along the Foothills from near the International boundary to Folding Mountain near Jasper. Near Lundbreck a hole had reached a depth of 9,857 feet, probably a world's record for cable tools. A hole in the Wildcat Hills west of Calgary was abandoned at 11,155 feet, after striking water in the Rundle limestone; another at Coalspur had reached 10,355 feet and was still being deepened. A third well started at Ram River after No. 2 had obtained a small production from the Devonian limestone had reached a depth of over 5,000 feet.

"The most notable event in the Foothills, however, was the striking, in December, at Jumping Pound, 20 miles west of Calgary, of wet gas comparable to that of the Turner Valley field. This well, a sequel to that drilled to 12,056 feet towards the close of 1943, which struck salt water in the Rundle and was abandoned, reached the limestone at 9,618 feet and a porous zone from 9,636 to 9,860 feet. This zone is believed to correspond to the lower porous zone of Turner Valley. The flow of gas was large and the liquid product ranged from a crude resembling that found in Turner Valley to water-white naphtha. Full testing was not possible before the close of the year.

"The total footage drilled in Alberta was 597,828 compared with 487,923 in 1943.

"A photographic aerial reconnaissance of the Foothills, begun late in July as a joint project of a number of large interests, was intended to cover 9,000 square miles from the International boundary, omitting areas already covered by the Geological Survey of Canada. Many geological and several geophysical parties were also active in Alberta during 1944.

"Prospecting for oil in Saskatchewan continued to be active and the structural and deep test drilling proceeded in association with widespread geological and geophysical surveys. The deep tests at Wilcox, Radville, and Buffalo failed to find gas or oil in commercial quantity, and two other holes were started, one near Elbow, and the other at Swift Current. Three wells, that were drilled south of Unity, had shows of oil, and two of them were completed as gas wells. Several holes were being drilled near Lloydminster, and drilling was done at Yorkton, Torch River, Kisby, Simpson, Maple Creek, and Dysart.

"Although the drilling of wells under the Canol project in the Northwest Territories was discontinued, exploratory drilling was maintained by Imperial Oil, Limited. At the end of 1944 there were 58 wells in the Norman field producing or capable of producing oil, 54 of which were drilled as part of the Canol project. The size of the field as determined by the drilling is 5,000 acres, and recoverable reserves are estimated to range from 30 million to 60 million barrels. The productive formation, a reef limestone, is reached at depths of 1,050 to 1,150 feet in the shallower wells on the right bank of the Mackenzie River, and at 1,706 feet in one of the wells on Bear Island.

"In Ontario, most of the production was again obtained from the Petrolia, Oil Springs, Bothwell, and Mosa fields, with lesser amounts from West Dover, Warwick, Dunwick, Thamesville, and several other townships. Drilling in Kent county was extended into Lake Erie.

"On Gaspé Peninsula, Quebec, no further drilling was done in No. 1 well of Continental Petroleum, Limited. In its No. 2 well, $4\frac{1}{2}$ miles to the west, drilling had reached a depth of over 2,000 feet.

"In Prince Edward Island the deep test well that was started from a pier in Hillsborough Bay in 1943 had reached a depth of 11,868 feet.

"In New Brunswick the geophysical work in the Stoney Creek area was continued. A large acreage was being held in the province for prospecting.

"In Nova Scotia two wells in the Mabou area, Cape Breton, were abandoned; and a well at Kennetcook in the Windsor area had reached a depth of 3,000 feet.

"Production in the Turner Valley field in Alberta came from a total of 257 oil wells and from 49 gas wells. Most of the output is crude oil obtained from the oil wells, and there is a small output of naphtha from gas wells. Considerable natural gasoline is recovered from the gas treated in absorption plants.

"Outside Turner Valley, 11 fields in Alberta were producing or were capable of producing in 1944, the largest of these being the Vermilion field 120 miles east of Edmonton.

"Production in the Vermilion field, Alberta, in 1944 was 150 per cent greater than in 1943. This increase can be traced partly to the completion of the new plant, which, by an electrical method, removes the water and salt from the oil. The treated oil is used as a fuel in the locomotives of the Canadian National Railway. Nineteen wells were brought into production in the field in 1944. Farther east, at Lloydminster, on the border of Saskatchewan, a plant was built to treat a somewhat similar crude.

"In the Taber field in the southern part of Alberta, the productive area was further outlined and 3 or 4 miles to the west another pool appears to have been discovered. The oil has a gravity of 19° A.P.I. and is virtually free from water. Its flash point is too low for direct use as fuel and it is shipped partly by tank car to Calgary, and partly by truck to local refineries. From July to the end of 1944 more than 24,000 barrels were produced from two wells at Conrad, 20 miles south of the Taber field, and the oil was shipped to Regina.

"Delivery of crude from the Norman field in the Northwest Territories to the refinery at Whitehorse, Yukon, was started on April 16 and on April 30 the refinery went into operation. Its throughput capacity is 3,500 barrels of crude a day, and its products were 100 octane gasoline, motor gasoline, fuel gasoline, Diesel X fuel oil, and road oil. The refinery, like the pipe-line and the Canol wells, was an undertaking of purely military character. The throughput capacity and the products of the refinery at Norman remained the same as in 1943. The price of ethyl gasoline at Norman was reduced to 35 cents a gallon, and that of aviation gasoline to 68 cents.

"Canada in 1944 imported 57,041,285 barrels of crude petroleum for refining, compared with imports of 49,700,143 barrels in 1943. This represented much the greater part of the total value of imports of petroleum and its products in the two years, the total for 1944 being \$100,997,763 as compared with \$94,843,848 in 1943. In 1943 the United States supplied 81 per cent of the imports of crude oil; Venezuela, 10.8 per cent; and Colombia, 8.2 per cent. In 1944, however, the United States supplied only 60.4 per cent; whereas Venezuela supplied 21.2 per cent, and Colombia, 17.2. The remainder came from Ecuador and the Dutch West Indies.

"Exports of petroleum and its products from Canada in 1944 were valued at \$12,117,533, as compared with \$8,652,465 in 1943 and with \$848,558 in 1939."

THE CANOL PROJECT, 1945

(Lands, Parks and Forests Branch, Department of Mines & Resources, Ottawa)

Production of crude petroleum in the Northwest Territories showed a sharp decline following suspension of activities associated with the Canol Project. On March 8, 1945, the United States Government ordered its agent, Imperial Oil, Limited, to discontinue all drilling and production on Canol account. The pumping of crude oil through the Canol pipeline from Norman Wells to Whitehorse, Y.T., and operation of the refinery at Whitehorse were discontinued about April 1, 1945. The Canol Project agreement was officially terminated on May 3, 1945.

A considerable quantity of crude petroleum and refined products in storage at Norman Wells, the property of the United States Government, was still on hand when the Canol Project ended. These refined products and crude stock were turned back to Imperial Oil, Limited. As a result, there was no necessity to operate the Norman Wells refinery until the late summer of 1945. The production of crude oil was also limited to a quantity sufficient to supply gas for the domestic requirements of the Norman Wells camp.

A total of 63 wells was drilled in the vicinity of Norman Wells under the Canol Project. Of these 60 were commercial producers. These wells were in addition to four pre-Canol wells developed by Imperial Oil, Limited, prior to 1942. In addition, four wildcat wells were drilled for Canol Project some distance from the proven field in an attempt to discover new pools, but were abandoned as dry holes.

Total oil production for the period in which the Canol Project operated—May, 1942 to March 8, 1945—was 1,858,447 barrels. Prior to 1942 a total of 118,895 barrels had been produced. Production for the period March 9, 1945 to August 31, 1945 was 33,947 barrels. The latest estimate of the recoverable reserve of the Norman oilfield, made in 1945, is 36,250,000 barrels.

Table 221.—Production of Crude Petroleum in Canada, by Provinces, 1935-1944

Year	New Brunswick		Ontario		Alberta		Northwest Territories		Canada	
	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$	Barrels	Value \$
1935.....	12,954	18,230	165,041	346,156	1,263,510	3,102,227	5,115	25,575	1,446,620	3,492,188
1936.....	17,112	24,075	165,495	350,767	1,312,368	3,019,930	5,399	26,995	1,500,374	3,421,767
1937.....	18,089	25,496	165,205	356,000	2,749,085	4,961,002	11,371	56,855	2,943,750	5,399,353
1938.....	19,276	27,246	172,641	359,268	6,751,312	8,775,094	22,855	68,565	6,966,084	9,230,173
1939.....	22,799	32,082	206,379	401,430	7,576,932	9,362,363	20,191	50,477	7,826,301	9,846,352
1940.....	22,167	31,220	187,644	397,078	8,362,203	10,694,394	18,633	37,265	8,590,978	11,160,213
1941.....	31,359	44,102	160,238	337,760	9,918,577	13,985,906	23,664	47,328	10,133,838	14,415,096
1942.....	23,089	39,467	143,845	306,242	10,117,073	15,514,665	75,789	108,477	10,364,796	15,968,851
1943.....	24,530	34,342	132,492	311,356	9,601,530	15,724,518	293,750	400,201	10,052,302	16,470,417
1944.....	23,296	32,832	125,067	296,420	8,727,366	14,468,061	1,223,675	632,587	10,099,404	15,429,900

(*) Includes 331 barrels at \$256 in Saskatchewan.

Table 222.—Production of Crude Petroleum in Canada, by Months, 1944

(Barrel=35 Imperial Gallons)

Month	(*) New Brunswick	Ontario	Alberta (*)	(*) North-west Territories	Canada	
	Barrels	Barrels	Barrels	Barrels	1944	1943
January.....	1,836	10,394	759,676	59,606	831,512	856,361
February.....	1,689	11,712	703,067	71,789	788,257	775,985
March.....	2,009	10,209	752,690	106,538	871,446	856,649
April.....	1,844	9,453	712,882	114,331	838,010	832,765
May.....	2,078	12,250	793,713	104,294	827,335	868,321
June.....	1,925	10,980	695,158	68,671	818,678	821,869
July.....	1,881	11,192	725,198	68,071	806,342	843,127
August.....	1,854	9,831	744,964	70,954	827,603	853,531
September.....	1,815	11,148	713,353	125,947	852,283	823,054
October.....	2,266	10,550	730,851	134,409	878,083	855,009
November.....	2,194	9,612	715,272	128,674	855,752	829,559
December.....	1,905	7,730	741,042	128,447	879,124	836,072
Total.....	23,296	125,067	8,727,366	1,223,675	10,099,404	10,052,302

(*) These figures include total output each month.

Table 223.—Production of Crude Petroleum in Canada, 1943 and 1944

	1943		1944	
	Barrels	Total value	Barrels	Total value
NEW BRUNSWICK.....	24,530	\$ 34,342	23,296	\$ 32,832
ONTARIO—				
Petrolia and Enniskillen.....	45,308	105,300	41,433	96,853
Oil Springs.....	27,270	66,811	28,537	70,774
Moore Township.....	332	772	133	311
Sarnia Township.....	305	709	268	626
Plympton Township.....	26	60	27	63
Bothwell Township and Thamesville.....	25,908	60,212	24,966	58,360
West Dover, Romney, Raleigh, and Tilbury East.....	9,177	21,328	7,642	17,864
Onondaga.....	11	26	7	16
Mosa Township.....	16,327	37,945	15,585	36,431
Dunwich.....	1,422	3,305	1,728	4,039
Dawn and Euphemia.....	439	1,020	257	601
Warwick, Metcalfe, and Adelaide Townships.....	5,967	13,868	4,484	10,482
Total Ontario.....	132,492	311,356	125,067	296,420
SASKATCHEWAN.....				
ALBERTA—				
Turner Valley.....	9,452,697	15,124,315	8,326,314	13,322,102
Red Coulee.....	8,928	9,107	3,835	4,755
Wainwright-Ribstone (heavy crude).....	139,905	591,096	397,217	1,141,204
Taber-Moose Dome.....				
Total Alberta.....	9,601,530	15,724,518	8,727,366	14,468,061
NORTHWEST TERRITORIES.....	293,750	400,201	1,223,675	632,587
Canada.....	10,052,302	16,470,417	10,099,404	15,429,900

Table 224.—Petroleum Wells in Canada, by Provinces, 1942-1944

	New Brunswick	Ontario	Alberta	Northwest Territories	Canada
Productive wells at beginning of year.....	1942 20 1943 21 1944 22	1,956 1,852 1,728	274 305 365	3 20 26	2,253 2,198 2,141
Number of productive wells drilled.....	1942 1 1943 1 1944 1	13 1 6	45 66 81	17 9 32	76 77 120
Number of wells abandoned.....	1942 1943 1944	54 144 47 13	14 6 19 21	..... 3 1	63 153 67 34
Number of dry wells drilled.....	1942 1943 1944	17 18 21 22	19 41 305 365	1 20 26	37 69 2,198 2,141
Number of productive wells in operation at end of year.....	1942 21 1943 22 1944 23	1,852 1,728 1,690	305 365 426	20 26 57	2,198 2,141 2,196

Table 225.—Imports Into Canada of Petroleum, Asphalt and Their Products, 1943 and 1944

Item	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
Asphaltum or asphalt, solid or not.....	cwt.. 149,657	291,186	121,064	318,308
Oil, imported by miners or mining companies, for the concentration of ores or metals.....	gal. 68,473	46,759	83,192	54,249
Crude petroleum for refining, 0-8155 specific gravity (42-0 A.P.I.) or heavier at 60° Fah.....	M gal. 1,739,505	66,305,137	1,996,445	71,934,216
Crude petroleum for refining, lighter than 0-8155 specific gravity (42-0 A.P.I.) at 60° Fah.....	gal. ....	.....	2,295	97
Crude petroleum, n.o.p.....	gal. 1,877,930	78,649	227,218	9,105
Fuel oil, ex-warehoused, for ships' stores.....	gal. 27,816,694	906,568	23,215,553	1,030,184
Coal oil and kerosene lighter than 0-8236 specific gravity at 60° Fah. n.o.p.....	gal. 10,692,591	673,080	8,890,511	581,669
Engine distillate 0-8017 specific gravity or heavier at 60° Fah.....	gal. 596,503	41,039	474,253	33,065
Gasoline, lighter than 0-8236 specific gravity at 60° Fah.....	gal. 70,500,782	10,032,231	67,498,115	11,415,619
Natural casinghead, compression or absorption gasoline lighter than 0-8690 specific gravity (80-0 A.P.I.) at 60° Fah. when imported by refiners of crude petroleum for blending with gasoline wholly produced in Canada.....	gal. 27,004,010	1,906,482	23,902,460	1,771,836
Lubricating oils, composed wholly or in part of petroleum and costing less than 25 cents per gallon.....	gal. 8,098,301	1,431,157	7,475,273	1,300,413
Lubricating oils n.o.p.....	gal. 5,383,999	2,977,951	6,217,714	3,131,929
All other oils n.o.p.....	gal. 384,534	462,299	1,713,954	987,065
Imports of petroleum n.o.p., 0-8236 specific gravity (40-3 A.P.I.) or heavier at 60° Fah.....	gal. 53,570,321	2,066,407	63,323,016	2,561,065
Petroleum greases and lubricating greases n.o.p.....	lb. 10,291,447	687,555	10,516,483	669,316
Refined petroleum jellies and oils for toilet, medicinal, edible or similar purposes.....	.....	498,071	.....	460,419
Paraffin wax.....	lb. 20,743,199	1,309,089	17,564,432	1,142,662
Paraffin wax candles.....	lb. 116,089	25,441	138,468	34,300
Products of petroleum n.o.p., lighter than 0-8236 specific gravity at 60° Fah.....	gal. 1,184,055	157,411	1,300,046	157,944
Liquefied petroleum gases.....	.....	191,226	.....	342,643

Table 226.—Exports of Petroleum and Its Products From Canada, 1943 and 1944

Item	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
Petroleum, crude.....	gal. 1,004,659	115,484	1,036,227	117,666
Oil, coal and kerosene, refined.....	gal. 16,316,270	3,119,194	22,817,385	5,706,320
Gasoline and naphtha.....	gal. 54,687,171	3,681,177	46,794,915	2,927,303
Fuel oil.....	gal. ....	.....	697,710	213,706
Lubricating oil (from January 1, 1944).....	gal. 2,200,684	429,941	465,790	83,268
Oil, mineral, n.o.p. (including lubricating oil prior to 1944).....	gal. 48	575	1,145	8,411
Wax, mineral.....	cwt. ....	.....	.....	.....

Table 227.—Principal Statistics Relating to Production of Crude Petroleum, 1944 (a)

	Ontario	Alberta	Northwest Territories	Canada
Number of firms.....	111	112	1	224
Number of active wells (b).....	1,690	492	59 (c)	2,264
Number of employees—On salary.....	17	616	246	879
On wages.....	142	1,284	242	1,668
Total.....	159	1,900	488	2,547
Salaries and wages—Salaries..... \$	20,279	1,312,073	718,059	2,050,411
Wages..... \$	94,350	2,810,085	859,830	3,764,265
Total..... \$	114,629	4,122,158	1,577,889	5,814,676
Selling value of products (gross)..... \$	296,420	14,889,351	632,587	15,818,358
Cost of fuel and electricity..... \$	30,455	970,020	.....	1,000,484
Cost of process supplies used..... \$	6,492	195,819	40,000	242,311
Selling value of products (net)..... \$	259,473	13,723,503	592,587	14,575,563

(a) Data for New Brunswick are included in the Natural Gas Industry.

(b) Includes wells still drilling and dry wells completed in year specified.

(c) Includes 23 in New Brunswick.

Table 228.—Employees, Salaries and Wages in the Petroleum Industry in Canada, by Provinces, (*) 1943 and 1944

Province	Average number of employees				Salaries and wages		
	Salaried employees		Wage-earners	Total	Salaries	Wages	Total
	Male	Female					
1943					\$	\$	\$
Ontario.....	13	3	146	162	16,922	109,543	126,465
Alberta.....	330	107	1,346	1,783	1,008,021	2,804,152	3,812,173
Canada†.....	496	155	1,748	2,399	1,547,605	3,665,290	5,212,895
1944							
Ontario.....	14	3	142	159	20,279	94,350	114,629
Alberta.....	469	147	1,284	1,900	1,312,073	2,810,085	4,122,158
Canada†.....	641	238	1,668	2,547	2,050,411	3,764,265	5,814,676

(*) Data for New Brunswick are included in the Natural Gas Industry.

† Data for Northwest Territories included with Canada.

Table 229.—Wage-Earners, by Months, 1943 and 1944 (Number on Pay-roll on the Last Work Day of Each Month)

Month	1943			1944		
	Male	Female	Total	Male	Female	Total
January.....	1,442	6	1,448	1,680	15	1,695
February.....	1,439	7	1,446	1,629	15	1,644
March.....	1,508	8	1,516	1,582	15	1,597
April.....	1,519	8	1,527	1,587	17	1,604
May.....	1,606	9	1,615	1,664	17	1,681
June.....	1,624	8	1,632	1,678	17	1,695
July.....	1,845	10	1,855	1,737	22	1,759
August.....	1,925	10	1,935	1,687	22	1,709
September.....	1,879	13	1,892	1,685	21	1,606
October.....	1,943	21	1,964	1,503	23	1,526
November.....	1,981	23	2,004	1,538	22	1,560
December.....	1,931	24	1,955	1,470	21	1,491
Average.....	1,736	12	1,748	1,646	22	1,668

OIL SHALE

(Bureau of Mines, Ottawa)

There are large deposits of oil shale in different parts of Canada, the best known occurrences being in Pictou and Antigonish counties, Nova Scotia, and Albert and Westmorland counties, New Brunswick. As shale oil cannot compete with petroleum at present prices, none of these deposits has been actively developed on a commercial scale.

No production has been reported for a number of years and no oil shale is being imported into Canada.

Experimental plants were erected in 1928-30 near Rosevale, New Brunswick, and New Glasgow, Nova Scotia, to treat local shales but they operated only for short periods.

For many years the large-scale production of oil shale was confined to Scotland, but deposits in Manchuria and Esthonia were being developed in 1938 on a large scale. The production of these countries in 1938 was: Scotland, 1,551,346 tons; Esthonia, 1,450,885 tons; and Manchuria, approximately 3,000,000 tons. In 1939 South Africa is reported to have produced 3,000,000 gallons of shale oil. In Australia the Federal and New South Wales Governments are reported to be giving considerable assistance to the shale oil industry, the production in 1942 being 1,600,000 gallons of shale oil.

A large amount of investigational work has been carried out by the Bureau of Mines, Ottawa, including the determination of the petroleum content of representative samples from various localities; the determination of important factors affecting the recovery of crude petroleum by destructive distillation and of the character of the petroleum recovered; and the investigation of the process designed for the distillation of oil shale.

In 1942, the Mines and Geology Branch, Department of Mines and Resources, Ottawa, drilled some of the oil shale deposits in New Brunswick to determine their possibilities as a source of oil and lubricants under war conditions. A total of 43 holes were drilled in oil shale deposits in the Rosevale area and in the vicinity of Taylor Village, New Brunswick; 36 holes were also drilled in deposits at Albert Mines, New Brunswick. The conclusion was reached after assaying more than 3,300 samples, that the over-all grade of the shales in the areas mentioned is too low to be of economic interest even under present conditions.

Owing to the depletion of petroleum reserves, interest has been renewed in oil shale in the United States. It is announced that the U.S. Bureau of Mines is building an oil shale research and development laboratory at the University of Wyoming at Laramie. A site has also been selected, in Colorado, for an oil shale demonstration plant to cost \$1,500,000.

(2) PETROLEUM PRODUCTS INDUSTRY

Statistics for the Petroleum Products Industry cover all establishments in Canada which were occupied chiefly in (a) the refining of crude oil to produce gasoline, fuel oil, etc., and (b) the blending or compounding of lubricating oils and greases.

Thirty-two refineries and 16 blending plants, or a total of 48 works, reported under this category in 1944 and the aggregate value of production was \$210,547,416, an increase of 13 per cent over the 1943 total of \$187,106,054.

Output figures for 1944 included \$209,125,332 for petroleum refineries and \$1,422,084 for concerns engaged in blending oils and greases, against corresponding totals in 1943 of \$185,830,862 and \$1,140,133 respectively. The principal statistics for each of these groups and for the industry as a whole are tabulated below and the detailed figures for each division are recorded separately in the succeeding pages of this report.

Table 230.—Materials Used in Petroleum Products Industry, 1943 and 1944

Material	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Crude oil (under 60° A.P.I.) in its natural state, from Canadian wells.....	Imp. gal.	322,873,457	17,371,041	287,359,621	16,061,249
Absorption gasoline, etc., from Canadian wells (run to stills).....	Imp. gal.	14,197,217	891,721	13,176,450	796,167
Crude oil, in its natural state, imported, (run to stills)—					
(a) From United States.....	Imp. gal.	1,443,428,128	91,367,996	1,162,235,098	73,219,333
(b) From Other Countries.....	Imp. gal.	303,062,252	18,203,645	820,436,701	50,612,860
Crude oil, not in its natural state (run to stills).....	Imp. gal.	491,855	73,487	.....	.....
Benzol for blending.....	Imp. gal.	2,674,901	382,248	3,650,151	548,753
Phenol.....	pound	557,550	82,103	892,069	126,539
Sulphuric acid, 66° Be.....	pound	40,683,213	462,617	42,768,370	461,306
Sulphur.....	pound	94,432	2,360	102,090	2,628
Caustic soda.....	pound	6,218,934	178,163	8,331,182	223,316
Soda ash.....	pound	398,557	9,377	480,416	11,335
Litharge.....	pound	305,045	23,582	369,981	30,346
Fullers' earth, bentonite and other clays.....	pound	25,390,653	601,283	27,993,850	653,741
Compounding materials.....	.....	.....	287,571	.....	353,699
Tetraethyl fluid.....	c.c.	1,752,403,904	4,024,703	1,393,917,796	3,311,309
Blending stocks for aviation gasoline.....	Imp. gal.	7,925,244	2,061,939	14,997,331	4,769,116
Other materials.....	.....	.....	800,930	.....	896,425
Shipping containers.....	.....	.....	667,259	.....	609,244
Total.....			137,492,025		152,687,371
Lubricating oils and greases.....			667,859		871,293
Grand Total.....			138,159,884		153,558,664

Table 231.—Products Made in Petroleum Products Industry, 1943 and 1944

Product	Unit of measure	1943		1944	
		Quantity	Gross selling value at works	Quantity	Gross selling value at works
			\$		\$
MADE FOR SALE—					
Gasoline ⁽¹⁾ —Straight run—Aviation.....	Imp. gal.	118,866,138	23,250,266	106,179,849	20,824,870
Standard.....	Imp. gal.	273,228,417	31,567,666	361,781,250	42,181,182
By cracking ⁽²⁾ —Aviation.....	Imp. gal.	1,641,220	290,331	1,083,600	159,525
Standard.....	Imp. gal.	475,323,338	54,884,836	501,611,868	59,577,615
Stove oil (40°–42.5° A.P.I.).....	Imp. gal.	27,628,033	1,689,781	28,437,386	1,730,572
Gas and light fuel oil (20°–40° A.P.I., except diesel).....	Imp. gal.	131,731,939	7,986,051	117,459,777	6,902,795
Diesel fuel oil (all fuel oil sold under this name).....	Imp. gal.	113,610,054	6,425,857	91,905,867	5,087,576
Residual fuel oil (10°–20° A.P.I.).....	Imp. gal.	536,980,450	25,754,878	561,755,157	26,599,271
Tractor and engine distillate.....	Imp. gal.	39,433,111	3,926,571	42,125,587	4,016,304
V.M. and P. or solvent naphtha.....	Imp. gal.	24,842,055	2,870,943	27,542,328	3,301,265
Kerosene.....	Imp. gal.	29,014,580	3,091,665	28,108,877	3,261,941
Lubricating oil.....	Imp. gal.	39,651,627	8,671,595	46,450,828	10,814,700
Lubricating grease.....	pound	21,411,920	1,216,548	19,853,223	869,580
Asphalt.....	Imp. gal.	45,879,562	3,732,572	62,909,214	5,419,257
Petroleum coke.....	ton	78,166	567,482	71,158	507,166
Other products ⁽³⁾	2,006,815	.....	9,400,632
Total—Made for Sale.....			178,593,857		200,954,911
MADE FOR OWN USE—					
Gasoline—Straight run.....	Imp. gal.	151,221	41,780	267,342	46,682
By cracking process.....	Imp. gal.	77,903	9,120	17,263	2,667
Stove oil.....	Imp. gal.	1,017	52	1,075	53
Gas and light fuel oil (20°–40° A.P.I.).....	Imp. gal.	47,781	3,111	45,223	2,982
Diesel fuel oil.....	Imp. gal.	107,178	6,103	116,372	6,476
Residual fuel oil (10°–20° A.P.I.).....	Imp. gal.	83,543,453	3,996,747	101,424,680	4,609,437
Tractor and engine distillate.....	Imp. gal.	.....	245	.....	19
Kerosene.....	Imp. gal.	182,622	18,510	68,236	7,707
Lubricating oil.....	Imp. gal.	92,198	20,182	117,341	26,575
Asphalt.....	Imp. gal.	27,997	2,137	213,197	17,570
Petroleum coke.....	ton	7,146	49,355	1,651	10,997
Still gas.....	M cu. ft.	8,385,106	2,953,760	9,167,488	3,193,500
Other products.....	.....	.....	271,207	.....	245,756
Total—Made for Own Use.....			7,372,064		8,170,421
Greases, lubricating.....	pound	1,103,187	172,642	1,252,890	187,240
Oils, lubricating.....	gallon	1,295,122	860,879	1,201,271	1,080,979
Soaps and soap powders.....	.....	.....	34,368	.....	40,449
All other products.....	.....	.....	72,244	.....	113,416
Total.....			1,140,133		1,422,084
Grand Total.....			187,106,054		210,547,416

(1) Includes recoveries from Turner Valley naphtha and natural gasoline run to refinery stills but does not include the imported casinghead gasoline which was used for blending at the refineries.

(2) Includes polymer gasoline.

(3) Includes wax, candles, still gas for sale, butane, propane, cumene, etc. These items were reported by fewer than three companies so, in accordance with the provisions of the Statistics Act, the figures cannot be shown separately.

CHAPTER EIGHT

THE NON-METALLIC MINING INDUSTRIES IN CANADA. (Other than Fuels)

Including detailed data relating to operations in the following industries:—

Asbestos	Miscellaneous	Magnetitic dolomite
Feldspar, Nepheline	Barite	Magnesium sulphate
Syenite and Quartz	Diatomite	Mineral waters (natural)
Gypsum	Fluorspar	Phosphate
Iron oxides (ochre)	Garnet	Pyrites (sulphur)
Mica	Graphite	Silica brick
Peat fuel	Grindstones, etc.	Sodium carbonate
Peat moss	Lithium minerals	Sodium sulphate
Salt		Strontium minerals
Talc and soapstone		

THE ASBESTOS MINING INDUSTRY, AND THE ASBESTOS PRODUCTS INDUSTRY

Canadian production of asbestos in 1944 totalled 419,265 short tons valued at \$20,619,516 compared with 467,196 tons worth \$24,409,416 in 1943. The mineral in 1944 came, as in recent years, entirely from deposits located in the province of Quebec.

There were nine firms engaged in asbestos mining during 1944; employees numbered 4,050 and salaries and wages paid were reported at \$6,401,185. Fuel and electricity consumed were valued at \$1,636,031 and \$1,166,707 were expended for explosives, drill steel and other process supplies. The value of new equipment and plant purchased during the year under review totalled \$294,889 and the industry paid \$3,950,331 in taxes in 1944. Total sales of asbestos during 1944 included 1,547 short tons of crude material valued at \$621,956; 190,233 tons of fibres worth \$14,305,966 and 231,389 tons of shorts at \$5,691,594.

Exports of Canadian asbestos in 1944 included 1,541 short tons of crude valued at \$649,564; 181,668 tons of milled fibres worth \$13,634,772; asbestos waste, refuse and shorts, 212,728 tons at \$5,361,358, and asbestos manufactures, \$184,189. Imports of various asbestos products were appraised at \$1,977,516.

The following information is from a report "Asbestos in 1944" as prepared by the Bureau of Mines, Ottawa:

"Asbestos of commerce consists mostly of the three varieties known as chrysotile, amosite, and crocidolite or blue asbestos, chrysotile being by far the most important and most widely used. Three other varieties, namely fibrous actinolite, fibrous tremolite, and anthophyllite, have only a limited field of usefulness.

"The asbestos produced in Canada is practically all of the chrysotile variety and comes almost entirely from areas of serpentinized rock in the Eastern Townships, Quebec, where the producing centres are Thetford Mines, Black Lake, East Broughton, Vimy Ridge, Asbestos and St. Remi de Tingwick. The Canadian deposits are the largest known in the world.

"Small deposits of chrysotile asbestos are known in other parts of Quebec and also in Ontario and British Columbia, and several of them have been worked from time to time. The asbestos from some of these deposits has a very low content of iron and is entirely free from magnesite, and should be suitable for use in making insulation for electrical machinery.

"No amosite or crocidolite has been found in Canada, but there are numerous deposits of fibrous tremolite, fibrous actinolite, and anthophyllite, which varieties are commercially termed amphibole asbestos. The fibres of these varieties are harsher and weaker than those of chrysotile and there is little demand for them at present. None of these deposits is being worked, although formerly fibrous actinolite was quarried near the village of Actinolite, Hastings

county, Ontario, for use in the making of roofing materials. Asbestos deposits reported as having been found in recent years in Manitoba and in northern and western Ontario are of the amphibole varieties. The amphibole fibres are too harsh and brittle to be spun, but they have a higher resistance to acids than has chrysotile, and it is possible that material from some of the deposits is suitable for use in acid filters and for other purposes where long harsh fibres are required. Small trial shipments for testing for this use were made from a property near Calabogie, Ontario, and from another near Val d'Or, Quebec, in 1944.

"Production has been continuous from the Thetford area since 1878 and reserves of asbestos-bearing rock are huge. Core-drilling to depths greater than 1,700 feet has revealed the presence of fibre comparable in quantity and quality with that in the present workings. Most of the output consists of vein fibre obtained from veins $\frac{1}{4}$ to $\frac{1}{2}$ inch in width, though veins exceeding 5 inches in width occur. The fibres run crosswise of the vein and thus the width of the vein determines the length of fibre. Slip fibre, occurring in fault planes, is obtained largely in the East Broughton area.

"The asbestos-bearing rock is mined in open pits and underground. The block-caving method of underground mining is coming into general use. This method was put into operation at the King mine of Asbestos Corporation in 1934. Johnson's Company is now using the same method, and Bell Asbestos Mines and Canadian Johns-Manville are sinking shafts preparatory to recovering rock by block-caving operations.

"Uses, Prices and Outlook.—Asbestos is used for a great variety of purposes, the principal products being: cloth, brake linings, clutch facings, packings, insulation, mill-board, siding, shingles, roofing, tile, and pipes.

"Prices throughout 1944 remained the same as in 1943. F.O.B. Quebec mines, in U.S. funds, tax and bags included, they were as follows: No. 1 crude, \$650 to \$750 per ton; No. 2 crude, \$165 to \$385; spinning fibres \$124 to \$233; magnesia insulation and compressed sheet fibres \$124 to \$146.50; shingle fibres \$62.50 to \$85; paper fibres \$44 to \$49; cement stock \$28.50 to \$33; floats, \$19.50 to \$21; shorts \$14.50 to \$26.50 per ton.

"The post-war outlook for the asbestos industry appears to be good. Throughout the war Canadian producers were able to sell their entire output in spite of the loss of overseas markets, and with the coming of peace these overseas markets will again be open to Canadian fibre. Development of new asbestos products has been rapid in recent years. Of particular significance are the developments in asbestos-cement products which require the short grades of fibre, the marketing of which formerly constituted a problem. In 1944 an asbestos fabric reinforced with glass fibre was developed which has greater strength than the straight asbestos cloth and is being used for covering."

Table 232.—Sales and Shipments (*) of Canadian Asbestos, 1942-1944

—	1942		1943		1944	
	Tons	\$	Tons	\$	Tons	\$
Crudes.....	2,889	1,233,184	2,016	888,099	1,547	621,956
Fibres.....	199,829	15,339,128	217,889	16,071,843	190,233	14,305,966
Shorts.....	236,741	6,090,971	247,291	6,209,563	227,485	5,691,594
Total.....	439,459	22,663,283	467,196	23,169,505	419,265	20,619,516
Sand, gravel, and stone (waste rock only) (a)	8,090	7,925	6,914	6,745	4,521	3,539

—	1942	1943	1944
Quantity of rock mined..... tons	8,233,516	7,920,471	7,778,805
Quantity of rock milled..... tons	6,795,459	6,828,532	6,587,740
Value of containers..... \$	(b)	1,233,166	1,213,321

(*) All from the province of Quebec unless otherwise noted; values include cost of containers.

(a) This production is included under the sand and gravel industry.

(b) Data not available.

Table 233.—Principal Statistics of the Asbestos Industry in Canada, 1942-1944

	1942	1943	1944
Number of firms.....	8	9	9
Capital employed..... \$	18,741,364	20,831,427	(e) 354
Number of employees—On salaries (c).....	329	345	354
On wages.....	3,420	3,499	3,696
Total.....	3,749	3,844	4,050
Salaries and wages—Salaries..... \$	731,836	772,455	805,330
Wages.....	4,567,618	4,804,279	5,595,855
Total..... \$	5,299,454	5,576,734	6,401,185
Selling value of products (a)..... \$	22,671,208	24,409,416	21,836,376
Cost of fuel and electricity (purchased)..... \$	1,646,291	1,625,450	1,635,829
Cost of process supplies (b)..... \$	2,747,682	1,651,260	1,166,909
Cost of containers..... \$	(d)	1,233,166	1,213,321
Net value of sales..... \$	18,277,235	19,899,540	17,820,317

(a) Includes value of sand and gravel.

(b) Explosives, drill steel, etc.

(c) In 1942 includes 60 females, 91 in 1943 and 87 in 1944.

(d) Not reported separately.

(e) Not recorded in 1944.

Table 234.—Sales and Shipments of Asbestos, 1927-1944

Year	Tons	\$	Year	Tons	\$
1927.....	274,778	10,621,013	1936.....	301,287	9,958,183
1928.....	273,033	11,238,860	1937.....	410,026	14,505,791
1929.....	306,055	13,172,581	1938.....	289,793	12,800,195
1930.....	242,114	8,390,163	1939.....	304,472	15,859,212
1931.....	164,296	4,812,886	1940.....	346,805	15,619,865
1932.....	122,977	3,039,721	1941.....	477,846	21,468,840
1933.....	158,367	5,211,177	1942.....	439,459	22,663,283
1934.....	155,980	4,936,326	1943.....	467,196	23,169,505
1935.....	210,467	7,054,614	1944.....	419,265	20,619,516

Table 235.—Consumption of Asbestos in Specified Canadian Industries, 1943 and 1944

Industry	1943		1944	
	Quantity	Cost at works	Quantity	Cost at works
		\$		\$
Boilers, tanks and engines.....	(*)	28,983	(*)	51,485
Asbestos Products—				
Fibre..... ton	11,536	548,706	10,748	499,610
Other forms..... ton	227,487	227,487	494	226,325
Roofing paper..... ton	823	18,275	865	23,152
Cotton goods, n.e.s..... pound	10,768	607	4,425	247

(*) Not available.

Table 236.—Imports Into Canada and Exports of Asbestos, 1943 and 1944

	1943		1944	
	Tons	\$	Tons	\$
IMPORTS				
Asbestos clutch facings for automobiles, motor vehicles and chassis...	xxx	347,844	xxx	350,779
Asbestos brake linings for automobiles, motor vehicles and chassis...	xxx	405,220	xxx	523,171
Asbestos brake linings and clutch facings, n.o.p.....	xxx	37,439	xxx	39,919
Asbestos in any form other than crude, and all manufactures of, n.o.p..	xxx	1,368,216	xxx	963,387
Asbestos packing.....	140	146,443	112	100,260
Total.....	xxx	2,305,162	xxx	1,977,516
EXPORTS				
Asbestos (crude).....	1,990	859,511	1,541	649,564
Asbestos milled fibres.....	210,837	15,673,929	181,668	13,634,772
Asbestos waste, refuse and shorts.....	230,172	5,848,031	212,723	5,361,358
Asbestos manufactures, including asbestos roofing.....	xxx	139,209	xxx	184,189
Total.....	xxx	22,520,680	xxx	19,829,883

Table 237.—Taxes Paid by Asbestos Mining Industry in Calendar Years 1943 and 1944

	1943	1944
Dominion Income Tax, including tax on non-operating revenue.....	\$ 1,172,891	\$ 2,205,452
Dominion Excess Profits Tax.....	2,719,858	1,108,470
PROVINCIAL TAXES—		
Mining taxes paid on net profits from production, including portion paid to municipality.....	452,710	453,440
Corporation Income Tax where levied in addition to Mining Tax.....		
Taxes paid on capital and places of business.....	30	40
Acreage Taxes.....	218	348
Total Provincial.....	452,958	453,828
MUNICIPAL TAXES—		
Based on property valuation.....	165,997	182,581
Based on non-operating revenue.....		
Total Municipal.....	165,997	182,581
Grand Total Taxes Paid.....	4,511,704	3,950,331

Table 238.—Certain Expenditures Made by the Asbestos Mining Industry, 1942-1944

	1942	1943	1944
Workmen's compensation.....	\$ 161,888	\$ 292,970	\$ 305,290
Unemployment insurance.....	61,833	63,629	63,917
Aggregate cost of all supplies purchased.....	3,503,085	3,420,456	3,271,141
Aggregate cost of plant and equipment purchased.....	440,542	300,738	294,889
Cost of buildings, machinery and equipment erected or installed during the year...	(*)	(*)	553,273

(*) Data not recorded.

Table 239.—Wage-Earners Employed, by Months, in the Asbestos Mining Industry in Canada, 1941-1944

Month	1941	1942	1943	1944				
	Total	Total	Total	Mine			Mill	
				Surface		Under-ground	Male	Female
				Male	Female	Male		
January.....	3,072	3,366	3,469	1,403	36	535	1,714	2
February.....	3,148	3,343	3,481	1,370	37	536	1,700	2
March.....	3,194	3,335	3,523	1,358	35	545	1,722	2
April.....	3,138	3,362	3,525	1,355	35	527	1,732	2
May.....	3,198	3,380	3,507	1,417	37	526	1,728	2
June.....	3,290	3,377	3,518	1,402	31	489	1,728	2
July.....	3,554	3,480	3,518	1,488	36	472	1,709	2
August.....	3,640	3,483	3,513	1,507	40	473	1,716	2
September.....	3,806	3,510	3,525	1,457	40	452	1,721	2
October.....	3,821	3,532	3,535	1,473	23	480	1,731	2
November.....	3,756	3,532	3,497	1,544	32	501	1,730	2
December.....	3,740	3,323	3,388	1,407	31	496	1,701	2
Average.....	3,446	3,420	3,499	1,438	34	503	1,719	2

Table 240.—Materials Used in the Asbestos Products Industry, 1943 and 1944

Material	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
Asbestos fibre.....	lb.	23,071,434	\$ 548,706	21,495,240	\$ 499,610
Asbestos cloth.....	lb.	67,938	32,727	54,381	25,069
Asbestos paper, corrugated and plain.....	lb.	562,516	28,542	498,743	24,398
Asbestos sheets and strips.....	lb.	29,994	18,926	43,678	24,256
Asbestos yarn.....	lb.	325,940	147,292	328,803	152,602
Cotton cloth and yarn.....			156,373		144,955
Rubber and rubber sheets.....	lb.	75,194	25,679	76,730	22,344
Containers and packing material.....			107,586		80,577
All other materials.....			1,358,414		1,307,476
Total.....			2,424,245		2,281,287

Table 241.—Products Manufactured in the Asbestos Products Industry, 1943 and 1944

Product	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Asbestos brake linings—Moulded.....	ft.	4,157,728	1,326,839	5,062,416	1,523,789
Other.....	ft.	1,826,829	458,828	1,422,221	392,659
Asbestos boiler and pipe covering.....	ft.	5,137,846	801,017 *	4,308,439	665,074
Asbestos clutch facings.....	No.		179,781		258,184
Asbestos gaskets.....	lb.		31,636		46,749
Asbestos packings of all kinds.....	lb.	487,798	224,937		203,884
All other products (*).....			2,221,700		1,670,246
Total			5,244,738		4,760,585

(*) Includes products made by 1 or 2 firms, such as asbestos dryer felt, hydraulic brake hose, asbestos shingles, asbestos yarn, asbestos paper, asbestos cloth, etc.

FELDSPAR AND QUARTZ MINING INDUSTRY

Owing to the very close physical association of these minerals in many Canadian deposits (pegmatites), it has been found difficult for some operators to make a separation of all data pertaining to the mining of each individual mineral and, for this reason, the general statistics relating to capital, employment, fuel and electricity, etc., have been combined in this bulletin by the Mining, Metallurgical and Chemical Branch of the Dominion Bureau of Statistics at Ottawa. Since 1936, corresponding statistics relating to the production of nepheline-syenite have been included with those pertaining to the commercial production of feldspar and quartz.

During 1944 the gross value of production by the industry, and comprising the value of feldspar, quartz and nepheline-syenite sold, totalled \$2,104,030 compared with corresponding values of \$2,138,229 in 1943 and \$1,998,996 in 1942. In 1944 commercial shipments of feldspar were made only from properties located in Ontario and Quebec; quartz (silica) in various forms was produced in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia, while production of nepheline-syenite was confined to the province of Ontario.

The number of firms reported as active in the industry in 1944 totalled 41; employees numbered 529; salaries and wages amounted to \$772,385 and the value of fuel, electricity and process supplies consumed aggregated \$407,901. The net value of all products sold in 1944 was estimated at \$1,636,093 compared with \$1,681,377 in 1943.

FELDSPAR

Production (producers' sales) of feldspar, crude and ground, during 1944 totalled 23,509 short tons valued at \$227,632 compared with 23,858 short tons worth \$237,771 in 1943. Of the 1944 output 17,842 tons worth \$177,271 were shipped from Quebec properties and 5,667 tons valued at \$50,361 from quarries in Ontario. The following information is from a recent report prepared by the Bureau of Mines, Ottawa:

"Most of the feldspar mined in Canada is of high-potash grade, though some operators also ship small amounts of soda spar. The latter type is rather uncommon as large deposits, but is sometimes encountered as zonal bodies along the walls of potash feldspar pegmatites. Canada has large reserves of feldspar, and production could be increased to meet any likely demand.

"There were no important new developments in 1944, and production continued at about the same level as during the preceding four-year period. As in former years about half the output went to the domestic market, and the other half was exported to the United States.

"In recent years, the entire production of feldspar has come from adjacent sections of western Quebec and eastern Ontario, in the general Ottawa region. Until 1942, mine output was about equally divided between the two provinces, but in that year Quebec gained a substantial lead and has since supplied 70 to 80 per cent of the total. In 1944, there were eight major producing mines, five in Quebec, and three in Ontario.

"In Quebec, most of the production came from three properties operated by Canadian Flint and Spar Company in Derry and Buckingham townships, in the Lièvre River section, and in Templeton township, all in Papineau county. The only other important producer was United Mining Industries, Limited, operating two properties in Buckingham and West Portland townships, respectively, in the same area. Both of these companies shipped a small tonnage of dental spar in addition to their regular ceramic grade.

"In Ontario the bulk of the output came from operations of Bathurst Feldspar Mines, in Bathurst township, Lanark county; and Madawaska Feldspar Company, Keystone Contractors, Limited, and Canspar Mines, Limited, in Murchison township, Nipissing District. Keystone Contractors worked its property until midyear, when it was taken over by Canspar Mines, a subsidiary of Lapa Cadillac Gold Mines, Limited.

"Feldspar for domestic use was ground in mills operated by the following:

Canadian Flint and Spar Company, Buckingham, Quebec.

Frontenac Floor and Wall Tile Company, Kingston, Ontario.

Bon Ami, Limited, 13719 Notre Dame Street East, Montreal, Quebec.

"The first two companies ground material mainly for ceramic purposes; the Bon Ami product is employed solely in cleanser compounds. Production of ground feldspar in 1944 totalled 10,902 tons, compared with 12,290 tons in 1943.

"World production of crude feldspar in 1937, the latest year for which complete statistics are available, totalled about half a million tons, of which the United States furnished over 50 per cent. In 1941, production in that country achieved a record of 338,860 long tons, valued at \$1,519,456, but declined slightly in subsequent years, the estimate for 1944 being 325,000 tons. The leading producing States are North Carolina, South Dakota, New Hampshire, Colorado, and Virginia. The production of ground spar in the United States in 1944 was about the same as in 1943, when shipments totalled 335,810 short tons. In 1937, Canada was fifth on the list of world producers, following Sweden, Norway, and Czechoslovakia.

"Domestic requirements for feldspar are relatively small, and a considerable part of the annual output of crude spar is exported to grinding mills in the United States. In 1943, domestic consumption of ground feldspar was 13,178 tons, distribution by industries being: cleansers, 45 per cent; pottery, 22 per cent; glass, 20 per cent; enamel, 13 per cent.

"All of the feldspar used in industry consists of ground material, usually prepared either in mills run in conjunction with mining operations or in merchant mills supplied from independent mines. Some manufacturers of ceramic products mine or buy crude spar and grind it for their own use. By far the greater part of the production (over 95 per cent in the United States in 1943) is employed for ceramic purposes, including pottery, glass, and enamelware. The remainder is used mainly in scouring soaps and cleansers, and for bonding of fired abrasive wheels and other shapes. Some coarsely crushed spar, usually made from impure waste or quarry fines, is sold for stucco dash, artificial stone, chicken grit, etc.

"Most of the feldspar used is of the high-potash type, but a certain amount of high-soda spar also is in demand for blending purposes and for use in low-fired enamels and glazes. Practically all colours of feldspar are equally acceptable for ceramic uses, but for cleanser purposes, pale shades of white to buff are demanded. Nepheline-syenite and aplite (an impure feldspathic rock) are to some extent competitive with feldspar for certain ceramic uses, notably in the glass trade.

"Until recently, the universal practice has been that all of the feldspar supplied to grinding mills has consisted of crude lump produced by picking and cobbing methods. As a result of threatened shortages in the eastern United States attention has been given in the past few years to the milling and concentrating of sub-grade rock to fill grinders' requirements. The Golding-Keene Company installed a concentrator at Keene, New Hampshire, a few years ago, and in 1943 a 30-ton pilot mill was placed in operation at Erwin, Tennessee, by Consolidated Feldspar Corporation. In 1944, the same company started construction of a 200-ton mill at Kona,

North Carolina, which is expected to come into production early in 1945. All the above mills employ flotation methods. Recently, also, there has been a small recovery of by-product feldspar from American mills engaged in concentrating the lithium mineral spodumene from pegmatite, and at Monterey, California, the Del Monte Properties Company lowers the feldspar content of its glass sand by flotation.

"Prices of Canadian crude feldspar in 1944 ranged from \$6 to \$7.50 a ton, according to grade, f.o.b. rail for export or shipment to domestic mills. Selected crude dental grade sold for \$45 to \$53 a ton in carload lots, for United States sale. Domestic ground spar was quoted at \$12.50 a ton for granular glass grade, and \$16.50 to \$20 for 200-mesh pottery grades, all in carload lots, f.o.b. mill.

"On crude feldspar entering the United States there is a duty of 25 cents a long ton. The duty on ground feldspar is 15 per cent ad valorem.

Table 242.—Production of Feldspar, Crude and Ground, in Canada, by Provinces, 1930-1944

Year	Quebec		Ontario		Manitoba	
	Tons	\$	Tons	\$	Tons	\$
1930.....	17,074	163,802	9,722	104,667		
1931.....	10,381	86,842	7,962	100,119		
1932.....	3,390	39,063	3,657	42,920		
1933.....	6,183	59,283	4,387	45,350		
1934.....	9,207	78,853	7,302	61,665	1,793	6,763
1935.....	7,002	63,075	8,656	75,003	2,084	6,252
1936.....	8,115	75,703	8,409	70,840	1,322	7,932
1937.....	12,285	105,612	9,061	72,610		
1938.....	5,874	62,878	8,106	65,964	78	451
1939.....	5,399	60,923	7,061	51,066	40	330
1940.....	8,548	89,004	12,907	98,619		
1941.....	14,218	137,160	11,822	107,124		
1942.....	16,802	164,588	5,468	49,353		
1943.....	17,199	176,222	6,659	61,549		
1944.....	17,842	177,271	5,667	50,361		

Table 243.—Feldspar Consumed in Specified Canadian Industries, 1942, 1943 and 1944

Industries	1942		1943		1944	
	Tons	\$	Tons	\$	Tons	\$
Abrasive products.....	119	4,113	117	5,776	75	2,260
Imported clay products.....	2,799	62,525	2,352	50,794	2,325	50,237
Soaps and cleaning preparations.....	4,249	43,904	12,733	63,283	15,383	35,423
Iron and steel products.....			509	10,824	529	10,814
Glass.....	2,874	45,231	2,598	41,454	2,382	34,612
Enamelling materials.....	331	4,965	265	3,840	377	5,655

NEPHELINE-SYENITE

Producers' sales of nepheline-syenite in 1944 were valued at \$217,989 compared with \$292,010 in 1943. Shipments during the year under review were made solely by the American Nepheline Corporation Limited. The deposit of this company is located in Methuen township, Peterborough county, Ontario. A report "Nepheline-Syenite in 1944" as prepared by the Bureau of Mines, Ottawa, contains the following information:

"Nepheline-syenite is a quartz-free crystalline rock consisting essentially of the feldspathoid mineral nephelite (a silicate of alumina, potash, and soda) with albite and microcline feldspars. It often contains varying amounts of iron-bearing minerals, chiefly black mica and magnetite, together with such accessory minerals as zircon, corundum, calcite, scapolite, etc. It has no free silica and is high in alumina (20 to 30 per cent in average commercial rock) as compared with straight feldspar (17 to 20 per cent), and it has thus found favour in the ceramic industries, particularly in the glass trade.

"Canada and Russia are the only countries that are known to produce nepheline-syenite on a commercial scale. Canadian reserves are large, and production can be increased greatly if necessary.

"The developed occurrences of nepheline-syenite in Canada are confined to Ontario, where deposits have been worked in Peterborough, Hastings, and Haliburton counties. The large operation of American Nepheline Corporation at Blue Mountain, near Lakefield, in Peterborough county, has accounted for most of the output and has been the only producer since 1942. Prior to that year small tonnages were produced intermittently from deposits near Bancroft, in Hastings county, and near Gooderham, in Haliburton county, and the material was shipped in the crude state to grinding mills in the United States. The rock of the Blue Mountain occurrence is massive and medium-textured, whereas most of the production from the Bancroft and Gooderham areas has consisted of coarse pegmatitic material. Other known, but undeveloped, occurrences in Ontario are in the French River area, Georgian Bay district, and at Port Coldwell, Thunder Bay district, on the north shore of Lake Superior. In Quebec, nephelite is a constituent of syenites of the Montreal, Labelle-Annonciation, and other areas. In British Columbia, there are extensive bodies in the Ice River district, near Field.

"Very large tonnages of nepheline-syenite are milled in Russia for the recovery of the contained phosphate (apatite), with the production of by-product nephelite. Deposits of commercial grade are reported to occur in British India, but have not as yet been developed. A number of occurrences are known in the United States, but most of the material contains too much inseparable, finely divided iron to be suitable for use in higher grade ceramic products.

"Nepheline-syenite is essentially a substitute for feldspar and continues to be used chiefly in the glass trade, where it is preferred to straight feldspar because of its higher content of alumina. Most Canadian glass companies, and several large American plants, now use the material. Some feldspar grinding plants in the United States use the syenite for blending with their granular glass spar. In the glass batch, 3 tons of syenite will replace 4 tons of feldspar, on the basis of relative alumina content, and the higher content of alkalis reduces the temperature of melting, with resultant saving of fuel and longer tank life. Research has been proceeding steadily on applications for nepheline-syenite in other branches of ceramics, and it has been found of advantage, owing to its higher fluxing action, as a body ingredient in a variety of products, including pottery, semi-vitreous ware, sanitary and electrical porcelain, floor and wall tile, and structural clay products, as well as in enamels. Increased vitrification, translucency, and mechanical strength, improved glaze-fit, and reduced absorption, warpage, thermal expansion, and crazing, are among the desirable properties claimed for the various types of ware made from it. For ceramic use the crude rock must be freed of its iron-bearing constituents, removal of which can often be readily effected by a relatively cheap process of magnetic separation at about 20-mesh size.

"Because of its relatively high alumina content, nepheline-syenite has attracted attention as a possible source of pure alumina for the production of aluminium, to replace bauxite, and commercial methods of treatment have been worked out. At present however, the process is being used on other more adaptable raw materials.

"Glass-grade nepheline-syenite for sale in Canada remained at \$11.75 per ton, bulk, in carload lots, f.o.b. Lakefield, and ground, 200-mesh, ceramic grade was quoted at \$16.50. Grade B (dust) sold for \$13 l.c.l. American prices also remained unchanged at \$12 for glass grade, and \$15.50 for ceramic grade, all bulk, in carload lots, f.o.b. Rochester, New York. Crude nepheline syenite enters the United States free of duty, provided that total imports of crude and ground material do not exceed 50,000 long tons in any calendar year. The duty on ground material is 15 per cent ad valorem."

Table 244.—Production of Nepheline-Syenite in Canada*, 1936-1944

Year	Quantity	Value	Year	Quantity	Value
		\$			\$
1936.....	(a)	(b) 37,426	1941.....	(a)	227,583
1937.....	(a)	121,481	1942.....	(a)	246,893
1938.....	(a)	142,737	1943.....	(a)	292,010
1939.....	(a)	140,148	1944.....	(a)	217,989
1940.....	(a)	117,849			

(*) Produced in Ontario only.

(a) Quantity not published.

(b) First commercial production in Canada.

Nepheline-syenite used in Canada in the manufacture of glass totalled 3,472 tons valued at \$58,629 in 1939, 4,233 tons at \$69,619 in 1940, 5,834 tons worth \$94,091 in 1941, 6,144 tons worth \$100,417 in 1942, 5,630 tons valued at \$93,528 in 1943 and 7,285 tons valued at \$130,383 in 1944.

Table 245.—Imports and Exports of Feldspar and Nepheline-Syenite, 1943-1944

	1943		1944	
	Tons	\$	Tons	\$
IMPORTS—				
Feldspar, crude.....				
Feldspar, ground.....	526	866	546	658
EXPORTS—				
Feldspar.....	12,724	96,453	13,081	102,918
Nepheline-syenite.....	36,240	129,826	35,310	123,905

QUARTZ (SILICA)

The production of natural silica or quartz in Canada during 1944 totalled 1,740,262 short tons valued at \$1,658,409 compared with 1,776,749 tons at \$1,608,448 in 1943. Output of primary silica products by the Canadian quartz mining industry includes crude and crushed dyke quartz, quartzite, sandstone and natural silica sands and gravels. The mineral in one or more of the forms thus defined was produced during 1944 in Nova Scotia, Quebec, Ontario, Saskatchewan and British Columbia. Shipments of silica in Nova Scotia were made to steel plants largely for the making of silica brick. In Quebec, high-grade silica sands were produced for the manufacture of glass and chemicals while a considerable tonnage of these same sands was sold for sand-blasting, moulding and various other purposes; in the same province relatively large quantities of crushed quartzite were mined and milled for the manufacture of silicon carbide and other products. The greater part of the tonnage of silica shipped in Ontario during 1944 represented material intended for use in the production of silica brick, cement and ferro-silicon and for the fluxing of nickel-copper ores. Quartz production as recorded for Saskatchewan represented low-grade natural silica sands or gravels shipped as flux to the Flin Flon smelter of the Hudson Bay Mining and Smelting Co. Ltd. Production in British Columbia in 1944 consisted of quartz shipped to the Trail smelter from the Bailey deposits located in the Greenwood mining district.

Quotations as given by "Canadian Chemistry and Process Industries" are: silica sand, various grades, in car lots \$9.00 to \$9.50 a ton; silica, quartz, 99 per cent, 110-220 grade, in car lots, \$14.00 to \$20.00 per ton; silica, soft decomposed, 325 mesh, car lots \$30.00 to \$35.00 per ton.

Table 246.—Production in Canada of Quartz, 1943 and 1944

	1943		1944	
	Short tons	Value	Short tons	Value
		\$		\$
PRODUCTION (*) (SHIPMENTS)—				
Nova Scotia.....	9,486	16,126	10,100	27,350
Quebec.....	214,959	605,916	236,091	639,429
Ontario.....	1,350,640	852,196	1,326,288	868,389
Saskatchewan.....	163,102	57,086	143,101	50,085
British Columbia.....	38,562	77,124	24,682	73,156
Canada.....	1,776,749	1,608,448	1,740,262	1,658,409

(*) Includes both crude and crushed quartz, crushed sandstone and quartzite, and natural silica sands.

Table 247.—Production (*) (Use) of Natural Low-Grade Silica Sand and Silica Gravel as Non-Ferrous Smelter Flux, 1942-1944

	1942		1943		1944	
	Tons	\$	Tons	\$	Tons	\$
Ontario.....	644,529	225,585	(†) 666,452	233,258	(†) 608,403	212,840
Saskatchewan.....	155,699	54,495	163,102	57,086	143,101	50,085
Canada.....	800,228	280,080	829,554	290,344	751,504	262,925

(*) Included in totals shown in Tables 246 and 248.

(†) Exclusive of low cost quartzite used in smelting nickel-copper ores.

Table 248.—Production of Quartz (Silica) in Canada, 1929-1944

Year	Ton	\$	Year	Ton	\$
1929.....	265,949	561,527	1937 (*).....	1,377,448	1,129,011
1930.....	226,200	418,127	1938 (*).....	1,380,011	961,617
1931.....	195,724	303,158	1939 (*).....	1,582,935	1,100,214
1932.....	189,132	276,147	1940 (*).....	1,858,302	1,203,527
1933.....	185,783	297,820	1941 (*).....	2,052,878	1,366,187
1934.....	272,563	482,265	1942 (*).....	1,738,174	1,538,162
1935.....	233,002	424,882	1943 (*).....	1,776,749	1,608,448
1936 (*).....	1,046,649	597,781	1944 (*).....	1,740,262	1,658,409

(*) Complete data for production of this material in Ontario previous to 1936 are not available.

Prices—UNITED STATES (August, 1945)—Silica, per ton, water ground and floated, in bags, f.o.b. Illinois: 325 mesh, \$21 to \$40 for 92 to 99½ per cent grades. Dry ground, air floated, 325 mesh, 92 to 99½ per cent silica, \$18 to \$30. Glass sand, f.o.b. producing plant, \$1.25 to \$5 per ton. Quartz rock crystals for fusing, all sizes, \$100 to \$150 per ton; prisms for piezoelectrical and optical use command premium. (Engineering and Mining Journal's "Metal and Mineral Markets"—New York).

The following information was obtained from the annual report "Silica in 1944" as prepared by the Bureau of Mines, Ottawa:

"The demand for high-grade silica sand was steady and large quantities are still imported. Silica sand for the manufacture of glass and silicate of soda has to be of a high degree of purity and uniformity, and Canadian producers must adhere rigidly to specifications and must guarantee regularity of shipments in order to take advantage of these markets. The use of Canadian sand for sandblasting is increasing.

"Silica sand is generally prepared from a friable sandstone by crushing, washing, drying, and screening to recover different grades of material according to the use for which it is required. In the manufacture of glass, for instance, the material should range between 20 and 100 mesh.

Silica sand may also be obtained from naturally occurring sands, the required grade being recovered by screening. In special cases it can be prepared from a friable quartz and from vein quartz.

"Silica, known as "potters' flint" for use in the ceramic industry must be 150 mesh or finer, whereas in the paint industry, air-floated material 250 mesh or finer is required.

"In the use of silica as a flux, smelter operators endeavour to obtain their material from the nearest possible source, and in many cases use a siliceous ore containing recoverable amounts of the precious metals. The silica requirements for the manufacture of ferrosilicon and silica brick depend upon the market for the finished products.

"Quartz, quartzite, or sandstone, in sizes from $\frac{1}{2}$ inch to 6 inches is used in the manufacture of ferrosilicon and pure silicon, and quartz and quartzite are used also as a smelter flux. For silica brick, quartzite is crushed to about 8 mesh. Some quartz is also crushed to make silica sand.

"The price per ton of the several grades of silica varies greatly depending on its purity and on the purpose for which it is to be used. Silica generally is a low-priced commodity, and therefore the location of a deposit with respect to markets is of great importance. The largest markets for silica are in Quebec and Ontario, and new deposits to be of interest to these markets should be within economic reach of either Toronto or Montreal. In Western Canada the main markets are in Alberta and Manitoba. West of Winnipeg the needs of silica are met almost entirely by imported material."

Table 249.—Consumption of Quartz, Silica Sand, Etc., in Canada, by Industries, According to Census of Industry Reports, 1943 and 1944

Industry	1943 (*)		1944 (*)	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Silica sand and silica (including ground quartz)—				
Soaps and cleaning preparations.....	3,640	128,981	4,563	129,696
Acids and salts.....	39,406	145,366	18,019	107,804
Paints.....	1,388	45,075	1,767	61,367
Refractories.....	1,021	10,240	1,053	10,223
Roofing paper.....	2,135	21,015	4,307	27,480
Abrasives (silica sand).....	89,022	511,649	73,771	428,317
Abrasives (quartz).....	175	5,410	268	8,046
Glass.....	132,992	870,454	131,987	866,696
Enamelling materials.....	253	3,795	400	6,000
Products from imported clays.....	3,597	54,812	3,441	55,627
Foundry facings and supplies.....	62	609	76	679
Non-ferrous smelters (†).....	868,116	367,468	776,186	336,182
Steel industry (silica sand).....	116,374	868,316	89,707	646,841
Ferro-alloys (quartzite).....	188,636	526,676	151,649	451,050
Total Accounted for.....	1,446,817	3,559,866	1,257,194	3,136,008

Note.—Consumption values are costs at works.

(†) The quantities reported under this industry contain low-grade natural siliceous sands for fluxing purposes.

(*) In addition to the quantities shown, a relatively large quantity of quartz and quartzite is consumed in the manufacture of silica brick.

Table 250.—Imports of Silica Into Canada, 1943-1944

Kind	1943		1944	
	Quantity	\$	Quantity	\$
Ground flint stone.....ton	884	17,617	1,481	30,487
Ganister.....ton	484	3,970	346	2,463
Silica sand for manufacturing.....ton	509,043	1,011,117	457,602	914,390
Silicx or crystallized quartz.....ton	11,411	945,967	8,774	530,200
Silica fire brick.....		847,456		713,538

NOTE.—Exports of silica are not classified separately as such in Canadian Trade Reports; exports of quartzite from Canada in 1944 totalled 126,608 short tons valued at \$260,181 compared with 68,555 tons worth \$124,345 in 1943.

Modern mechanized warfare depends upon instantaneous two-way radio communication, which, to be effective, must rely upon accurately ground wafers of crystal, two in each circuit; dozens are needed for a single tank or aeroplane. Brazil remained at the close of 1944 the only known commercial source of quartz suitable for radio-frequency control, and radio quartz crystal has been classified as a strategic mineral. No commercial production of domestic quartz crystals was reported in Canada during 1944; however, The Quartz Crystals Mining Company of Canada reported development work during the year on a quartz crystal deposit located north of Gananoque, in the province of Ontario. Imported crystals have been dressed in Canada for war use since the beginning of the second World War.

Table 251.—Principal Statistics of the Feldspar and Quartz Mining Industry, 1943 and 1944

	Ontario (b) (c)		Quebec	
	1943	1944	1943	1944
Number of firms (a).....	19	22	16	19
Capital employed..... \$	1,632,379	(d)	1,262,752	(d)
Number of employees—On salary.....	41	34	27	26
On wages.....	227	231	240	238
Total.....	268	265	267	264
Salaries and wages—Salaries..... \$	69,702	61,742	49,001	36,518
Wages..... \$	324,248	334,729	325,248	339,396
Total..... \$	393,950	396,471	374,249	375,914
Selling value of products (gross)..... \$	1,356,091	1,287,330	782,138	816,700
Cost of fuel and purchased electricity..... \$	61,648	78,687	72,599	87,814
Cost of process supplies, freight and containers..... \$	234,759	182,661	87,846	118,775
Net value of sales..... \$	1,059,684	1,025,982	621,693	610,111

(a) Small shippers from whom reports were unobtainable and whose production is recorded from consumers' returns are sometimes not included in the total.

(b) Includes data relating to production of nepheline-syenite.

(c) In 1943 includes 1 firm in Nova Scotia, 1 in British Columbia and 1 in Saskatchewan, and in 1944, 2 in Nova Scotia, 2 in British Columbia and 1 in Saskatchewan.

(d) Data not recorded in 1944.

Table 252.—Number of Wage-Earners on Pay Roll, by Months, 1943 and 1944

Month	1943 Totals	1944								Canada (*) Total
		Quebec			Ontario					
		Surface	Under-ground	Mill	Surface		Under-ground	Mill		
		Male		Male	Male	Female		Male	Female	
January.....	422	187	.....	80	94	2	14	26	1	450
February.....	450	225	.....	82	95	2	13	25	1	444
March.....	438	221	.....	77	154	2	15	26	1	497
April.....	418	161	.....	78	167	2	15	27	1	452
May.....	474	129	.....	73	184	2	34	38	1	475
June.....	503	150	.....	73	184	3	33	37	1	506
July.....	485	137	.....	73	167	3	33	36	1	476
August.....	506	154	.....	71	180	3	35	38	1	509
September.....	520	144	.....	74	171	3	33	40	1	492
October.....	488	149	.....	74	159	3	43	38	1	493
November.....	479	141	.....	76	150	3	42	31	1	470
December.....	416	121	.....	74	100	2	15	34	1	361

(*) Includes a few employees in some months in Nova Scotia and British Columbia.

THE GYPSUM INDUSTRY

(1) Primary Production—The Gypsum Mining and Quarrying Industry

Production (producers' sales and producers' consumption) of gypsum in Canada during 1944 totalled 596,164 short tons valued at \$1,511,978 compared with 446,848 short tons worth \$1,381,468 in 1943. The tonnage in both years represents various grades of crude gypsum or anhydrite shipped from quarries or mines, together with the tonnage of calcined gypsum used in or shipped from quarries or "primary" plants.

Of the 1944 output, Nova Scotia properties contributed 401,284 tons valued at \$489,932; New Brunswick 42,040 tons at \$200,748; Ontario 90,288 tons at \$348,873; Manitoba 38,330 tons at \$368,498, and British Columbia 24,222 tons worth \$103,927.

The quantity of crude mineral mined in 1944 included 12,250 tons of anhydrite and 524,106 tons of gypsum. Crude gypsum calcined in primary or quarry plants in 1944 totalled 194,748 tons.

In 1944 the firms reporting primary production numbered 12. Some of the Canadian gypsum mining companies restrict their operations in the Dominion to the production and sale of crude gypsum or anhydrite while others, in addition to marketing various grades of crude gypsum, produce a calcine for sale or for consumption in their own gypsum products plants.

Exports from the Dominion in 1944 included 386,949 short tons of crude gypsum valued at \$434,123 and 443 short tons of plaster of paris or wall plaster appraised at \$9,262. Imports included 560 short tons of gypsum valued at \$17,223 and 1,550 short tons of plaster of paris and wall plaster worth \$65,180.

During 1944 the primary industry provided employment for 328 persons and distributed \$490,872 in salaries and wages. The value of fuel, purchased electricity and process supplies consumed during 1944 totalled \$387,941 and the net value of production was estimated at \$1,124,037.

Complete data relating to world production of gypsum have not been available since 1938; the principal gypsum producing countries in that year were the United States, Germany, France, United Kingdom, Canada, Egypt, Latvia, Australia, Argentina, Russia and Japan.

The following information is from a report—Gypsum in 1944—as prepared by the Bureau of Mines, Ottawa:

"The materials produced are the hydrous calcium sulphate commonly known as gypsum, the partly dehydrated material known as plaster of paris or wall plaster, and the anhydrous calcium sulphate known as anhydrite. Nova Scotia is the chief producer of gypsum in Canada and is followed by Ontario, New Brunswick, Manitoba and British Columbia.

"A large tonnage of by-product gypsum is obtained from the production of phosphate fertilizers at the plant of Consolidated Mining and Smelting Company at Tadanac, B.C., and efforts to find an outlet for this material are being continued. A new gypsum mill and wall board plant is being constructed at Calgary, Alta. by Western Gypsum Products Ltd. and gypsum mined at Maynook, B.C. will be used in this plant.

"Consumption of gypsum in Canada in the gypsum products industries, including wall board, and hard wall plasters is approximately 180,000 tons a year, mostly as calcined gypsum. The Canadian cement industry consumes annually approximately 50,000 tons of crude gypsum.

"Gypsum is marketed in the crude lump form; ground, as "land plaster" and "Terra alba"; or ground and calcined, as plaster of paris or wall plaster. Each year an increasing portion of the calcined material is used in the manufacture of wallboard, gypsum blocks, insulating material, acoustic plaster, etc.

"The use of gypsum products in the building trades has made rapid progress because of their lightness, durability, fire-resisting, insulating, and acoustic properties; and tiles, wall-boards, blocks, and special insulating and acoustic plasters have been developed. As most of the crude gypsum is shipped to the United States for the manufacture of gypsum products, industrial conditions in that country will continue to have an important bearing on the industry. The manufacture of gypsum boards, for which there has been a large demand in recent years, has partly compensated for the decrease in use for residential building purposes.

"The use of anhydrite for the manufacture of sulphuric acid, ammonium sulphate, cement, and special plasters is increasing, and, normally, there is a good opportunity for the Canadian material in this market. Canada has extensive deposits favourably situated for commercial development, the material from which has been proved by tests carried out by the Department of Mines and Resources to be of excellent grade. Prior to 1937 the small Canadian production was exported principally for use as a fertilizer for the peanut crop, but it is possible that an industry will eventually be started in this country in which the anhydrite may be used for the manufacture of sulphur or sulphur compounds and of special plasters, similar to those being marketed in England.

"Crude gypsum is a low-priced commodity, and its selling price f.o.b. quarry is dependent largely upon the quantity produced and the production facilities available. For export, contracts are generally made with the producer for the year's requirements of the purchaser and these contracts are generally made early in each year. The price of crude gypsum as quoted by the Canadian Chemistry and Process Industries remained at \$2.50 to \$3.50 per ton f.o.b. mine throughout 1944."

Table 253.—Production in Canada of Gypsum, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	tons	\$	tons	\$
SHIPMENTS BY GRADES—				
Crude (a)—Lump or mine run.....	9,277	18,632	26,726	38,499
Crushed.....	276,498	403,406	398,142	463,677
Fine ground.....	719	6,070	5,508	16,244
Calcined gypsum, sold and used (b).....	160,354	953,360	165,788	993,558
Total.....	446,848	1,381,468	596,164	1,511,978
SHIPMENTS BY PROVINCES—				
Nova Scotia.....	255,736	368,639	401,284	489,932
New Brunswick.....	36,263	148,315	42,040	200,748
Ontario.....	92,448	335,637	90,288	348,873
Manitoba.....	37,989	380,529	38,330	368,498
British Columbia.....	24,412	148,348	24,222	103,927
Total.....	446,848	1,381,468	596,164	1,511,978
Total gypsum mined and quarried (a).....	430,822		536,356	
Total gypsum calcined (b).....	201,168		194,748	

(a) Includes some anhydrite quarried in Nova Scotia.

(b) Does not include gypsum calcined in manufacturing plants located in Montreal and Calgary, but includes calcine used in manufacturing plants operated in direct or close conjunction with the mines—the value of calcine used is its value as a process material.

Table 254.—Production (Sales) of Crude and Calcined Gypsum in Canada, 1935-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1935.....	541,864	932,203	1940.....	1,448,788	2,065,933
1936.....	833,822	1,278,971	1941.....	1,593,406	2,248,428
1937.....	1,047,187	1,540,483	1942.....	566,166	1,254,182
1938.....	1,008,799	1,502,265	1943.....	446,848	1,381,468
1939.....	1,421,934	1,935,127	1944.....	596,164	1,511,978

Table 255.—Consumption of Gypsum in Canadian Cement Industry, 1933-1944

Year	Tons	Year	Tons
1933.....	13,319	1939.....	31,492
1934.....	19,172	1940.....	38,903
1935.....	21,611	1941.....	49,031
1936.....	25,447	1942.....	49,816
1937.....	33,691	1943.....	47,034
1938.....	51,975	1944.....	42,672

Table 256.—Imports and Exports of Gypsum, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	tons	\$	tons	\$
IMPORTS—				
Gypsum, crude (sulphate of lime).....	5,000	12,400	560	17,223
Gypsum, ground, not calcined.....	490	16,828		
Plaster of paris and wall plaster.....	1,202	47,532	1,550	65,180
Total.....		76,850		82,403
EXPORTS—				
Gypsum or plaster, crude.....	185,210	213,022	386,949	434,123
Plaster of paris, wall plaster.....	478	8,844	443	9,262
Gypsum, ground.....				
Total.....		221,866		443,385

Table 257.—Principal Statistics of the Gypsum Mining Industry in Canada, 1940-1944

	Nova Scotia	New Brunswick Ontario, Manitoba, British Columbia	Total Canada
Number of firms—			
1940.....	6	3(a)	9
1941.....	6	2(a)	8
1942.....	5	2(b)	7
1943.....	4	2(b)	6
1944.....	5	3(b)	8
Number of employees—			
On salary—			
1940.....	33	24	57
1941.....	34	14	48
1942.....	28	27	55
1943.....	19	32	51
1944.....	22	14	36
On wages—			
1940.....	369	248	637
1941.....	328	272	600
1942.....	201	254	455
1943.....	99	288	387
1944.....	122	170	292
Salaries and wages—			
Salaries—			
1940..... \$	60,374	51,048	111,422
1941..... \$	62,083	28,852	90,935
1942..... \$	53,314	53,163	106,477
1943..... \$	38,299	78,418	116,717
1944..... \$	46,783	34,962	81,745
Wages—			
1940..... \$	369,090	237,154	606,244
1941..... \$	338,356	315,717	654,073
1942..... \$	231,431	319,712	551,143
1943..... \$	94,588	406,475	501,063
1944..... \$	167,603	241,524	409,127
Fuel and electricity cost—			
1940..... \$	76,224	118,740	194,964
1941..... \$	73,784	148,780	222,564
1942..... \$	36,831	141,851	178,682
1943..... \$	22,919	179,061	201,980
1944..... \$	27,941	120,802	148,743

Table 257.—Principal Statistics of the Gypsum Mining Industry in Canada, 1940-1944
—Concluded

		Nova Scotia	New Brunswick Ontario, Manitoba, British Columbia	Total Canada
Value of process supplies used—				
1940.....	\$	194,005	29,370	223,375
1941.....	\$	199,875	29,569	229,444
1942.....	\$	34,784	30,673	65,457
1943.....	\$	11,234	34,829	46,063
1944.....	\$	60,283	178,915	239,198
Selling value of products (gross)—				
1940.....	\$	1,302,347	763,586	2,065,933
1941.....	\$	1,517,297	731,131	2,248,428
1942.....	\$	512,762	741,420	1,254,182
1943.....	\$	368,639	1,012,829	1,381,468
1944.....	\$	489,932	1,022,046	1,511,978

(a) In addition, 2 companies also operated in Nova Scotia.

(b) In addition, 1 company also operated in Nova Scotia.

Table 258.—Number of Wage-Earners on Payroll or Time Record on the Last Day
of Each Month or Nearest Work Day, 1942-1944

Month	1942		1943		1944				
	Mine	Mill	Mine	Mill	Mine			Mill	
					Surface		Under-ground (*)	Male	Female
					Male	Female			
January.....	194	173	152	151	66	.....	84	73	.....
February.....	210	184	162	147	67	.....	82	68	.....
March.....	266	201	166	157	80	1	80	86	.....
April.....	270	215	177	152	113	1	74	92	.....
May.....	336	224	181	165	133	1	78	100	.....
June.....	331	240	197	170	135	1	75	110	.....
July.....	345	226	217	182	134	1	74	108	.....
August.....	338	227	244	179	144	1	75	113	.....
September.....	268	184	236	199	164	1	68	128	.....
October.....	188	169	236	198	160	1	71	118	.....
November.....	191	166	259	199	101	1	79	108	.....
December.....	157	141	268	190	84	1	78	82	.....

(*) Underground work confined to New Brunswick, Ontario and Manitoba.

(2) The Gypsum Products Industry

Nine Canadian factories, operated by 4 companies, manufactured gypsum products having a factory selling value of \$5,077,477 during 1944. This output was 6 per cent under the 1943 total of \$5,417,045. The main products were gypsum wallboard, gypsum hardwall plaster, gypsum tile and gypsum blocks.

The average number of employees in these works in 1944 was 569, to whom \$856,261 were paid in salaries and wages. Expenditures for fuel and electricity amounted to \$297,606 and materials used in manufacturing processes cost \$2,659,683.

Table 259.—Materials Used in the Gypsum Products Industry, 1943 and 1944

Material	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Gypsum, crude.....	ton	20,742	78,460	26,683	212,813
Gypsum, calcined (plaster of paris).....	ton	149,885	705,541	165,750	993,385
Paper.....	ton	14,240	868,457	15,089	999,201
Starch or paste.....	ton	499	31,488	678	50,391
Hair.....	ton	75	18,036	66	17,468
Retarder.....	ton	203	18,045	224	19,374
Sawdust and shavings.....	ton	165	2,259	246	3,105
Containers, etc.....			108,587		101,244
All other materials.....			420,561		262,702
Total.....			2,251,434		2,659,683

Table 260.—Output of the Gypsum Products Industry, 1943 and 1944

Product	Unit of measure	1943		1944	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Gypsum wallboard.....	sq. ft.	192,185,195	4,317,946	179,239,550	3,814,067
Gypsum hard wall plasters.....	ton	39,883	501,104	65,580	864,115
All other products (*).....			597,995		399,295
Total.....			5,417,045		5,077,477

(*) Includes gypsum tile and blocks, etc.

IRON OXIDES (OCHRE) MINING INDUSTRY

Production (producer's sales) in Canada of ochreous iron oxides during 1944 totalled 8,599 short tons valued at \$150,250 compared with 8,401 short tons worth \$135,893 in 1943. The output in these years included the mineral in both the crude and refined state. Of the 1944 shipments, 8,117 short tons valued at \$142,050 were made from deposits located in the province of Quebec and 482 short tons worth \$8,200 from a property in British Columbia.

Employees reported by the 6 firms comprising the industry in 1944 totalled 55 and salaries and wages paid amounted to \$49,876. Fuel and electricity used totalled \$19,115 while the cost of explosives and other process supplies consumed was recorded at \$6,700. The longest period of mining operations as reported by any single operator in 1944 was from May 10 to December 17.

The following information relating to Canadian ochreous oxides is taken from a report prepared by the Bureau of Mines, Ottawa:

"Ochreous iron oxide, which is sold uncalcined and is used chiefly in the purification of illuminating gas, comprises the bulk of the minerals produced under this category. The calcined form of ochreous iron oxide is used in the manufacture of paints. A smaller quantity of natural iron oxides associated with clay-like materials in the form of umbers and siennas is produced in the raw and in the calcined state for use as pigments in paints. The Canadian iron oxide industry is small and the quantity produced shows little change from year to year. Present producing localities have met the requirements of the domestic pigment trade for the cheaper grades for many years.

"The production for some time past has come mostly from deposits near Trois Rivières, Quebec, but there are other deposits in different parts of Canada that could be operated were the demand sufficient to warrant doing so.

"In the past, deposits in Quebec were operated near Ste. Anne de Beaupre, Montmorency county; in Lynch township, Labelle county; and at St. Raymond, Portneuf county.

"In British Columbia, there has been a small production since 1923 of iron oxide from Alta Lake, New Westminster district, and from oxide beds in the Windermere district. The oxide is used chiefly for gas purification.

"In Alberta and Saskatchewan, several deposits of ochre are known, some of which have commercial possibilities, but they are difficult of access and the market is limited and they have received little active attention. The most promising known deposit in Saskatchewan is located at Loon Lake, 32 miles from St. Walburg (station on C.N.R. line) and 77 miles northwest of North Battleford. These occurrences are being investigated by the Saskatchewan Department of Natural Resources. Large deposits near Grand Rapids and Cedar Lake in northern Manitoba remain undeveloped for similar reasons. In Nova Scotia, beds of ochre and umber were operated to a small extent in the past.

"Sherwin-Williams Company of Canada operated its deposits and plants at Red Mill, Champlain county, Quebec, and a few miles east of Trois Rivières. It is the only Canadian producer of calcined iron oxides, the others marketing only air-dried products. Its calcined and air-floated mineral products produced to rigid specifications are in use in the war industries. This plant, which produces most of the Canadian iron oxide was operated at capacity throughout 1944.

"Several small deposits are worked intermittently at Almaville, St. Louis, and St. Adelphe in Champlain county, and at Les Forges, and near Pointe-du-Lac, St. Maurice county.

"Most of the higher grade oxides, ochres, and umbers used in the paint trades were formerly imported from Europe, and prior to the war some of the cheaper grades of European oxides even competed with the domestic products, as they do not require calcining to produce the desired colour.

"The consumption of iron oxide by the illuminating gas industry in 1943 (figures for 1944 not available) was 6,568 tons, and the amount consumed in the paint industry was 2,321 tons.

"The Canadian price of red iron oxide, as given by Canadian Chemistry and Process Industries, remained at 2 to 7 cents a pound throughout 1944."

Table 261.—Production (Sales) in Canada of Iron Oxides, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
Quebec (*).....	7,998	131,057	8,117	142,050
British Columbia.....	403	4,836	482	8,200
Total	8,401	135,893	8,599	150,250

(*) Includes crude and refined grades.

Table 262.—Production of Iron Oxides in Canada, 1927-1944

Year	Quantity	Value	Year	Quantity	Value
	Short tons	\$		Short tons	\$
1927.....	6,125	103,536	1936.....	5,854	69,630
1928.....	5,414	111,198	1937.....	6,197	83,640
1929.....	6,518	115,932	1938.....	5,821	71,769
1930.....	6,596	83,873	1939.....	6,015	88,418
1931.....	5,520	49,205	1940.....	9,979	111,874
1932.....	5,240	46,161	1941.....	10,045	142,069
1933.....	4,357	53,450	1942.....	9,304	151,653
1934.....	4,959	66,166	1943.....	8,401	135,893
1935.....	5,516	77,075	1944.....	8,599	150,250

The production of iron oxides in Canada since the first recording of statistics in 1886 to the end of 1944 totalled 333,713 short tons valued at \$3,559,703.

Table 263.—Consumption of Iron Oxides in Specified Canadian Industries, 1935-1944

Year	Coke and Gas		Paints, Pigments and Varnishes			
			Iron Oxide Pigments		Ochres, Siennas and Umbers	
	Quantity	Value	Quantity	Value	Quantity	Value
	Tons (a)	\$	Tons	\$	Tons	\$
1935.....	3,701	46,204	990	77,758	564	56,219
1936.....	(b)	41,291	733	67,850	634	65,819
1937.....	(b)	40,414	890	81,709	566	49,082
1938.....	(b)	41,013	822	70,736	487	41,062
1939.....	(b)	35,417	882	80,274	523	46,134
1940.....	5,417	42,491	1,146	112,826	575	62,636
1941.....	5,133	36,480	1,602	187,836	464	58,385
1942.....	4,600	33,790	2,334	253,383	412	52,155
1943.....	6,568	45,946	2,321	222,858	440	68,425
1944.....	9,194	71,545	2,614	242,234	648	69,092

(a) Oxide and purifying materials.

(b) Data not available.

Table 264.—Principal Statistics of the Natural Iron Oxides Industry in Canada, 1942-1944

	1942	1943	1944
Number of firms.....	(d) 5	(d) 5	(d) 6
Capital employed..... \$	194,541	254,891	(a) 38,460
Number of employees—On salaries.....	(e) 6	(b) 7	(c) 8
On wages.....	41	40	47
Total.....	47	47	55
Salaries and wages—Salaries..... \$	9,174	10,293	11,416
Wages..... \$	35,114	36,261	38,460
Total..... \$	44,288	46,554	49,876
Selling value of products (gross)..... \$	151,653	135,893	150,250
Cost of fuel and purchased electricity..... \$	20,835	19,438	19,115
Cost of process supplies..... \$	5,780	7,590	6,700
Freight..... \$			11,670
Selling value of products (net)..... \$	125,038	108,865	112,765

(a) Not compiled.

(b) Three females.

(c) Four females.

(d) Four producing in Quebec and one in British Columbia.

(e) Two females.

Table 265.—Wage-Earners(*) Employed, by Months, 1943 and 1944

Month	Number				Month	Number			
	1943		1944			1943		1944	
	Mine	Mill	Mine	Mill		Mine	Mill	Mine	Mill
January.....		31		33	July.....	32	24	24	30
February.....		31		30	August.....	36	21	30	31
March.....		31		35	September.....	27	22	31	31
April.....		31		38	October.....	9	23	23	31
May.....	9	22	13	28	November.....	6	26	12	35
June.....	20	23	18	30	December.....	7	25	9	33

(*) No underground work and no female wage-earners.

Table 266.—Imports and Exports of Iron Oxides, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
	tons	\$	tons	\$
IMPORTS—				
Ochres, ochrey earths, siennas and umbers.....	1,125	76,644	1,431	70,168
Oxides, fireproofs, rough stuff, fillers and colours, dry, n.o.p.....	3,134	964,147	2,859	1,040,206
EXPORTS—				
Pigments, n.o.p. (exclusive of white lead).....	82	13,393	627	121,622
Iron oxides.....	1,831	131,830	2,026	120,327

THE MICA MINING INDUSTRY

Canadian production (primary shipments) of mica (all grades) in 1944 totalled 6,684,846 pounds valued at \$841,026 compared with 8,050,692 pounds worth \$553,856 in 1943. The value of the 1944 production established an all-time high record in the Canadian mica mining industry. Of the total output in 1944, mines in the province of Quebec contributed 2,274,634 pounds valued at \$178,899 and Ontario deposits 3,486,212 pounds worth \$646,745; shipments from mines in British Columbia amounted to 924,000 pounds worth \$15,382. Comprising the total 1944 output for the Dominion were 275,946 pounds of muscovite (white) mica valued at \$579,134 and 6,408,900 pounds of phlogopite or amber worth \$261,892.

The number of Canadian primary mica producers reporting commercial shipments in 1944 totalled 68 and \$359,797 were distributed in salaries and wages to 400 employees. The total net value of shipments was estimated at \$784,402.

Table 267.—Mica Production (Primary Sales) in Canada, by Classes, 1943 and 1944

Grade	1943		1944	
	Pounds	Total value f.o.b. shipping point	Pounds	Total value f.o.b. shipping point
Rough, mine-run or rifted.....	1,429,365	\$ 54,450	314,878	\$ 22,733
Mica sold for mechanical splitting.....	190,209	26,048	427,426	62,842
Splittings.....	73,691	53,820	44,350	32,123
Ground or powdered.....	6,065,551	63,210	5,381,779	66,167
Scrap: Mine or shop waste and mica mined and sold for grinding.....				
Flake (mica schist): Natural or recovered by milling.....				
Trimmed mica.....	291,876	356,328	516,413	657,161
Total mica shipments.....	8,050,692	553,856	6,684,846	841,026
VARIETIES: Phlogopite mica (amber).....	7,498,578	309,803	6,408,900	261,892
Muscovite mica (white).....	552,114	244,053	275,946	579,134
Total mica shipments.....	8,050,692	553,856	6,684,846	841,026

Table 268.—Production (Sales) of Mica in Canada, by Provinces and Varieties, 1944

Province	Phlogopite		Muscovite		Total	
	Pounds	\$	Pounds	\$	Pounds	\$
Quebec.....	2,272,531	177,526	2,103	1,373	2,274,634	178,899
Ontario.....	3,212,369	68,984	273,843	577,761	3,486,212	646,745
British Columbia (*).....	924,000	15,382			924,000	15,382
Total Canada.....	6,408,900	261,892	275,946	579,134	6,684,846	841,026

(*) Variety uncertain.

Table 269.—Production (*) of Mica in Canada, 1933-1944

Year	Short tons	\$	Year	Short tons	\$
1933.....	944	49,284	1939.....	1,068	147,321
1934.....	998	97,071	1940.....	975	237,145
1935.....	628	82,038	1941.....	1,743	335,288
1936.....	801	74,556	1942.....	3,010	363,567
1937.....	945	133,731	1943.....	4,025	553,856
1938.....	519	80,989	1944.....	3,342	841,026

(*) Sales.

The total value of mica produced in Canada from the first official recording of mica statistics in 1886 to the end of 1944 amounted to \$10,192,552.

Table 270.—Imports and Exports of Mica, 1943 and 1944

	1943		1944	
	Pounds	Value	Pounds	Value
		\$		\$
IMPORTS—				
Mica and manufactures of, n.o.p.....		220,356		185,986
Vermiculite, crude.....		18,482		21,166
EXPORTS—				
Mica, rough and trimmed (a).....	863,100	422,710		
Mica, scrap and waste.....	4,279,500	34,660	4,879,200	36,072
Mica splittings.....	65,900	47,108	75,800	56,211
Mica manufactures (c).....		16,540		994
Mica, rough, untrimmed.....			955,600	133,149
Mica, trimmed (b).....			282,100	572,541
Mica, ground, (b).....			600,900	18,340
Total mica exports.....		521,018		817,307

(a) To December 31, 1943.

(b) From January 1, 1944.

(c) Included mica ground prior to 1944.

Table 271.—Consumption of Mica in Canada, by Industries, as Reported to the Annual Census of Industry, 1943 and 1944

	1943		1944	
	Quantity	Cost at works	Quantity	Cost at works
	tons	\$	tons	\$
In electrical apparatus industry.....	145	324,919	164	396,978
In rubber industry.....	111	12,314	117	14,011
In roofing (*).....	395	23,160	702	36,260
In mica manufacturing industry.....	36	41,050		
Total accounted for.....		401,443		447,249

(*) Includes mica used in manufacture of wall paper.

The following information is taken from a report "Mica in 1944" as prepared by the Bureau of Mines, Ottawa:

"Canada is one of the two leading world sources of phlogopite, or amber mica, the other most important producer being Madagascar. Numerous occurrences of muscovite, or white mica, also are known in Canada, but only since the discovery in 1942 of exceptionally rich deposits in the Eau Claire area, Ontario, has there been a substantial production of this variety. Preliminary figures indicate that in 1944 the value of muscovite shipments from this field amounted to about 70 per cent of the total Canadian production of all classes and qualities of mica, and exceeded the entire value of the country's output in 1943. In 1943, also, the deposits furnished about 8 per cent of the total Canadian and American production of strategic muscovite, supply of which was drawn from many hundreds of mines.

"Although Canada has a substantial export trade in sheet mica, it also imports considerable quantities of muscovite splittings, block, and manufactured mica, the value of which in 1944 was \$185,986.

"The general supply situation in respect to mica of all classes showed a considerable and progressive improvement during 1944, particularly in reference to strategic qualities of muscovite and phlogopite required for capacitor and aviation spark plug use.

"In 1942, Colonial Mica Corporation, the United States Government mica purchasing agency, was empowered to extend its muscovite buying program to Canada. It established a special schedule of prices, entered into contracts, and in 1943 opened a Canadian office at North Bay, Ontario, and appointed a resident agent. During 1944, Colonial extended assistance to Canadian producers of both strategic-quality muscovite and phlogopite in the form

of loans of drill-compressor units and other equipment on a rental basis, and similar assistance was also given mica operators by the Department of Mines and Resources, Ottawa, in 1943 and 1944. Colonial terminated its Canadian buying program on December 31, 1944, leaving producers of all types and qualities of mica free to sell in the open market.

"Of technical interest was the development in 1943 of improved instruments for readily determining the power factor and the electrical conductivity of sheet mica. Appraisal solely by visual means caused the rejection of important amounts of sound mica. The new instruments are, respectively, the direct-reading Q-meter and the point-electrode conductivity tester, both developed by the Bell Telephone Laboratories. They are not intended to supplant visual inspection, but by their use it is expected that important amounts of mica of a quality hitherto rejected on account of appearance will become available for capacitor and other more exacting electrical needs. Instruments of the above type are now available in the Bureau of Mines, Ottawa, for the testing of mica samples.

"Most of the phlogopite mined in Canada has come from a belt of pyroxenite rocks that extends from Kingston to Ottawa, in Ontario, and thence northward into Quebec, between the Gatineau and Lièvre Rivers. The productive belt is from 60 to 70 miles wide and about 200 miles long. Scattered, outlying mica deposits occur also in Pontiac and Argenteuil counties, Quebec, and as far east as Quebec City; and in Ontario, similar deposits have been mined to the west in Hastings and Haliburton counties.

"In Quebec, the Nellis mine at Cantley, in Hull township, and the Phosphate King mine, in Templeton township, both of which are operated by Blackburn Bros., Blackburn Building, Ottawa, continued to be the chief sources of production in that province. Consideration was being given by New Calumet Mines, Limited, to the possibility of recovering a marketable flake mica product from mill tailings at this company's lead-zinc property on Calumet Island, Pontiac county. It is estimated that about 10 tons a day of plus 65-mesh mica can be recovered by screening the tailings discharge from 450 tons of ore milled. Tests were run in the Bureau of Mines, Ottawa, to remove impurities from the crude tailings by tabling, followed by wet-grinding in a ball mill. Samples of the resulting 200-mesh product were submitted to various consuming industries, but no decision was made by the company in regard to entering into production.

"In Ontario, the chief operator in 1944 continued to be Kingston Mica Mining Company, with mine near Godfrey, in Bedford Township, Frontenac county. The output of this property is exported in the form of rifted rough sheet to the United States for trimming and punch use, and is of special heat-resistant, spark plug quality. Canadian deposits yielding this class of phlogopite are comparatively few, the chief other sources being the Ericson mine, in Denholm township, Quebec, and a property at Petit Pré, near Quebec City. The last-named mine has been idle since 1942.

"At mid-year, operations were undertaken by Sydenham Mining Company to unwater and reopen the old Lacey mine of the General Electric Company, near Sydenham, in Frontenac county. Assistance for this work, in the form of a loan of equipment, was given by Colonial Mica Corporation. Considerable progress was made, and several consignments of rough, mine-run mica were shipped to the United States for trimming and punch use.

"In 1944, Micaspas Industries, Limited of Hamilton did some work on the old Richardson mine, in Loughborough township, and erected a small grinding plant. The plant was operated for only a short time, producing a few tons of ground mica, part of which was made from scrap off the property and part from purchased muscovite waste.

"Muscovite, the occurrence of which in commercial sheet form is confined to granite pegmatite dykes, is far more widely distributed in Canada than phlogopite, and deposits are known in many sections of Quebec and Ontario, as well as in Manitoba and British Columbia, and in the Baffin Island section of the Eastern Arctic. Spasmodic attempts at development of certain of these occurrences have been made, but it was not until the discovery in 1942 of deposits in the Eau Claire region that serious production of muscovite was undertaken.

Following the original discovery of the Eau Claire deposits on what is now the Purdy Company's property, several groups of claims were staked on adjacent ground by various syndicates, but none of these contain encouraging amounts of mica, and the quality, in general, is too low for profitable mining.

"In Quebec, there are deposits of ruby muscovite mica of strategic quality in Petain township, Abitibi county, and in Bergeronnes township, Saguenay county, the production from which has been small.

"In British Columbia, production consists only of schist or other micaceous rock, the sources of the output in 1944 being a deposit near Oliver, operated by R. C. McKay, and a deposit in the Albreda area that was opened by George Campbell. A number of pegmatitic occurrences of sheet muscovite are known in British Columbia, most of which lie in the Tête Jaune, Big Bend, and Fort Grahame areas. Small quantities of mica were taken from some of these deposits years ago, but for the most part the occurrences lie at high altitudes, above timber line, and they could be worked only for brief periods during the summer months.

"Ontario and Quebec continued to furnish practically all of the mica production, comprising sheet or block, splittings, ground, and scrap. The output in Ontario declined about 18 per cent in quantity, but increased nearly 110 per cent in value, while the output in Quebec decreased 50 per cent in quantity and 35 per cent in value. The above percentages of quantity, however, do not afford a true index of the sheet mica industry, since they include a large amount of scrap or waste sold for grinding use. For example, over 70 per cent of the total quantity of mica exported in 1944 was grinding scrap, having only 4 per cent of the total export value. In addition, nearly 9 per cent of the exports comprised ground mica having 2 per cent of the value.

"As a large part of the output is exported, export figures afford a fair index of the industry by types of products. The total quantity of mica exported amounted to 6,793,600 pounds valued at \$816,313. About 14 per cent of the exports by quantity, and 17 per cent by value, was rough phlogopite that was shipped to the United States and Mexico for trimming, splitting, or punching; 5 per cent by quantity, and 70 per cent by value, was trimmed block muscovite and phlogopite; 1 per cent by quantity, and 7 per cent by value, was phlogopite splittings; and 9 per cent by quantity, and 2 per cent by value, was ground phlogopite.

"Scrap mica, which was all consigned to American grinding plants, comprised 71 per cent of the quantity, and 4 per cent of the value. About 28 per cent of the exports of scrap was muscovite, having 34 per cent of the declared value, and 72 per cent was phlogopite, with 66 per cent of the value. Most of the scrap phlogopite is shipped to United States Mica Manufacturing Company, East Rutherford, New Jersey, and Forest Park, Chicago. In 1944, most of the scrap muscovite from the Purdy mine was shipped to Concord Mica Corporation, Concord, New Hampshire. Average calculated unit value of the muscovite scrap was \$17.75 per ton, and of the phlogopite scrap, \$12.80 per ton.

"About 500,000 pounds of the rough phlogopite, valued at nearly \$85,000, that was exported, comprised small sizes and was mostly recovered from old waste dumps. It was shipped to the United States for making heavy, random-thickness splittings by mechanical means.

"Sheet mica exported in the form of rough, mine-run material, trimmed block, and splittings, amounted to 1,313,500 pounds valued at \$761,901. Of this, 80 per cent by quantity and 90 per cent by value was consigned to the United States; 6 per cent by both quantity and value went to the United Kingdom; and 13 per cent by quantity and 3 per cent by value was shipped to Mexico for making into splittings.

"In general, Canadian phlogopite deposits tend to be of an erratic, impersistent, and pockety character, and this factor makes underground mining difficult and expensive and for the most part precludes any sustained, systematic attempt to develop ore-bodies. Only in comparatively few instances have workings been carried to depths greater than 100 feet, a

great part of the production having been derived from a large number of small, scattered, and intermittently operated surface pits. Reserves, however, are probably sufficient to maintain output at present levels for a considerable period.

"The larger producers of phlogopite operate their own mica shops, and sell direct to the trade, but a substantial volume of business is done also by dealers who purchase small lots of mine-run or trimmed block from small operators and grade, trim, or split the material for sale. Most of the splitting work is farmed out in small rural communities and is done on a piece-work basis.

"Madagascar, the other chief source of phlogopite, started to produce on an important scale around 1920, and since then has had an annual output of sheet mica about equal to that of Canada. Ceylon, Korea, Tanganyika, and Portuguese East Africa have also furnished small amounts of phlogopite, and a few years ago development of deposits in Mexico was commenced. Recently, the discovery of occurrences in the Northern Territory of Australia was reported.

"Muscovite mica is widely distributed, and many countries produce small quantities. India has long been the chief source of supply, and production there since 1942 has exceeded all previous records. Indian "ruby" muscovite, obtained from Bihar Province, is the world standard for exacting electrical uses, particularly for magneto and radio condenser films. India also supplies green muscovite, which is produced in Madras. In 1942 and 1943, the United States obtained about 70 per cent of its imports of strategic mica from India, where more than 100,000 persons were employed in the industry.

"Brazil also produces muscovite of ruby quality, and is second to India as a source of supply. Brazilian mica exports in 1943 totalled 1½ million pounds.

"The United States holds third position as a producer of muscovite, the chief producing States being North Carolina, South Dakota, New Hampshire, and Connecticut. American production has increased substantially during the present war, largely as a result of assistance furnished to operators by the Government, coupled with enhanced prices offered for official purchase.

"Mica possesses a combination of properties that make it of outstanding value as an insulating material in all forms of electrical equipment and appliances, and almost the entire production of sheet muscovite and phlogopite is used in the electrical industry.

"Vermiculite, a variety of mica which has the unique property of swelling enormously into exceedingly light-weight, accordion-like form when heated, is used extensively for thermal and acoustic insulation. The expanded product, also termed "Zonolite", has a specific gravity of only 6 to 8 pounds per cubic foot, is comparatively refractory, and has low thermal and sound conductivity. In the form of loose-fill, it is a valuable insulator in the walls and roofs of dwellings, industrial buildings, furnaces, ovens, and refrigerators, in which fields it competes with rock and glass wool. Combined with various bonding materials, it is fabricated into pipe covering, insulating blocks, plasters, tiles, and structural roof slabs, and it is also widely employed as a light-weight aggregate in concrete, including cast slabs for pre-fabricated houses. Such slabs are also being used for the decks, roofs, and fire-walls of ships and buildings subject to bombing attack. Plastic insulation made with vermiculite is used as a heat insulator on the outside of boilers and refinery columns, and as a sound-proofing agent in automobiles and aircraft.

"Most of the world supply of vermiculite is produced and used in the United States, where production in 1943 totalled 46,645 tons valued at \$471,595.

Prices: "Phlogopite.—Dealers' quotations for the various trade sizes in 1944 were approximately as shown below, according to quality as based on colour, hardness, and splitting properties:

Knife-trimmed Block or Sheet		Splittings	
Size, Inches	Per Pound	Size, Inches	Per Pound
1 x 1 and 1 x 2	\$0.35 to \$0.50	1 x 1	\$0.75
1 x 3	0.50 to 0.60	1 x 2	0.85
2 x 3	0.70 to 0.80		
2 x 4	0.95 to 1.00	(Splittings prices in U.S. funds)	
3 x 5	1.50 to 2.00		
4 x 6	1.75 to 2.50		
5 x 8	2.75 to 3.25		

"Ground phlogopite sold as follows, according to fineness: 20 mesh, \$30 per ton; 60 mesh, \$40; 150 mesh, \$65; all prices f.o.b. Ottawa, in ton lots, bags extra. Scrap phlogopite, for export, had an average declared value of \$12.80 per short ton, in carload lots.

"Muscovite.—Most of the small domestic consumption of muscovite is in the form of splittings for micanite manufacture, prepared films for condensers, and punched disks, segments, and washers, nearly all of which are imported. There are thus no established trade quotations for trimmed sheet muscovite, and little is handled by Canadian mica dealers. The scale of prices set up by Colonial Mica Corporation for Canadian muscovite in 1943 remained in effect throughout 1944 and was as follows, quotations being in Canadian funds, f.o.b. shipping point:

Size of Grade	No. 1 Quality	No. 2 Quality	No. 3 Quality
inches	\$	\$	\$
1 x 1	1.54	0.66	0.33
1¼ x 1¼	2.09	0.88	0.44
1½ x 2	2.75	1.485	0.77
2 x 2	4.125	2.31	1.21
2 x 3	5.225	2.97	1.54
3 x 3	5.775	3.41	1.76
3 x 4	6.16	3.96	2.09
3 x 5	6.60	4.62	2.42
4 x 6	7.70	5.17	2.75
6 x 8	8.80	6.05	3.19
8 x 10	11.00	8.25	4.40
10 x 12	13.20	9.90	5.28

"Prices set for "thins" (under 7 mils) ranged from \$0.50 to \$2.50 per pound, according to size and quality.

"The above schedule of sizes was set up specifically to meet Canadian conditions, more especially the output of the Purdy mine, and does not conform to any regular trade standards. With the termination of Colonial Mica Corporation's buying program in Canada on December 31, 1944, Purdy Mica Mines went over to the Indian standard system of grading, and established a new scale of prices for subsequent sales.

"Montana cleaned and screened crude vermiculite was quoted in 1944 at \$12 a short ton, f.o.b. mine, and North Carolina crude at \$9.50. The expanded product weighs only 6 pounds per cubic foot, as compared with 60 pounds for the natural mineral. It is usually marketed in 24-pound bags, and American quotations averaged \$75 to \$80 a ton f.o.b. plant. Value of sales in the United States in 1943 is estimated at about \$3,250,000."

Table 272.—Principal Statistics of the Mica Mining Industry in Canada, 1943 and 1944

	1943	1944		
	Canada (*)	Quebec	Ontario	Canada (*)
Number of firms or operators.....	(b) 78	49	19	(a) 70
Capital employed..... \$	458,402	(c) 6	16	(c) 22
Number of employees—On salary.....	39	138	240	378
On wages.....	391			
Total.....	430	144	256	490
Salaries and wages—Salaries..... \$	57,307	8,328	31,259	39,587
Wages..... \$	309,685	115,094	205,116	320,210
Total..... \$	357,992	123,422	236,375	359,797
Selling value of products (gross)..... \$	553,856	178,899	646,745	841,026
Cost of fuel and electricity..... \$	24,757	14,627	8,959	23,586
Cost of process supplies used..... \$	29,638	20,928	12,110	33,038
Selling value of products (net)..... \$	499,461	143,344	625,676	784,402

(*) Does not include general statistics for 2 operating plants in British Columbia in 1943 for which data are not available, also 2 in British Columbia in 1944.

(a) Includes 68 producing.

(b) Includes 71 producing.

(c) Not recorded in 1944.

Table 273.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1943 and 1944

Month	1943				1944			
	Mine		Shop(*)		Mine		Shop(*)	
	Surface	Under-ground	Male	Female	Surface	Under-ground	Male	Female
January.....	94	40	55	68	72	55	65	241
February.....	84	39	53	85	(†) 77	63	65	228
March.....	100	36	72	103	(†) 75	70	64	210
April.....	107	33	79	113	(†) 72	75	59	202
May.....	114	29	61	106	(†) 71	64	64	160
June.....	163	29	80	122	73	72	65	155
July.....	156	23	66	159	78	79	65	151
August.....	138	27	64	157	66	74	57	186
September.....	132	35	56	133	64	72	48	179
October.....	129	37	62	267	69	68	41	128
November.....	102	31	64	312	73	63	38	90
December.....	104	30	60	282	76	60	32	79
Average.....	130	33	69	159	80	68	59	171

(*) Includes outside workers.

(†) Includes one female.

PEAT INDUSTRY

The Canadian peat industry comprises both firms producing peat as a fuel and peat moss and humus for various other purposes. During 1944 production of peat fuel totalled 644 short tons valued at \$5,397 compared with 782 tons worth \$7,000 in 1943. Of the 1944 output 444 tons valued at \$3,597 originated in the province of Quebec and 200 tons at \$1,800 in Ontario.

Commercial production (shipments) of peat moss in Canada during 1944 totalled 80,446 short tons valued at \$1,869,553 (less cost of containers but including resale of purchased moss) compared with an output of 64,360 tons worth \$1,461,422 in 1943. Included in the 1944 production were 2,000 tons from New Brunswick bogs, 19,033 tons from Quebec, 12,491 tons from Ontario, 1,128 tons from Manitoba and 45,794 tons from British Columbia. Total Canadian production of moss in 1944, according to grade, were 27,558 tons valued at \$559,000 for horticultural use; 204 tons at \$5,164 as insulation; 40,739 tons worth \$1,005,045 as poultry and stable litter; 8,972 tons at \$250,480 for metallurgical purposes and 2,973 tons valued at \$49,864 unspecified. Included in the tonnage classified as unspecified was a considerable quantity of humus utilized in the manufacture of fertilizer and as a soil conditioner. It is

estimated that the total shipments as reported for 1944 contained resales of purchased moss approximating 17,446 tons worth \$315,553. Products were marketed in the form of bales, bags, pads and fertilizer manufactures. The value of packing material or containers totalled \$288,426. Canadian moss sold for metallurgical purposes was used in the United States in the manufacture of magnesium metal.

The number of firms reported as active in the production of peat moss and peat fuel or the development of peat bogs totalled 39 in 1944 compared with 44 in 1943. In 1944 the industry distributed \$1,154,009 in salaries and wages to 1,183 employees, 167 of whom were females. The net value of production was estimated at \$1,780,000 as against \$1,384,770 in 1943 and \$1,031,211 in 1942.

The following information relating to peat is from a report prepared by the Bureau of Mines, Ottawa:—

“Peat is the name given to the material produced by the incomplete decomposition of vegetable matter either in water or in the presence of water, under such conditions that atmospheric oxygen is excluded. The character of the peat depends upon the conditions under which it was formed, and on the nature of the vegetation which contributed to its formation. Many species of plants are found in peat bogs, the most abundant being mosses, such as sphagnum and hypnum; marsh and heath plants; grasses, rushes, etc.; marine plants; and sometimes trunks, roots and leaves of trees. Peat is found in every province of the Dominion and generally speaking, occurs in two distinct forms—humified, or fuel peat, and unhumified, or moss peat.

“Peat moss is the dead moss of the sphagnum plant. Its chief value lies in its ability to absorb and hold up to 25 times its own weight of liquids and gases. It is used as a bedding litter for animals and as a filler for fertilizers. Because of its elasticity and low heat conductivity, it is also used for insulating and sound-proofing and as a packing material.

“The Canadian production of peat moss is practically all exported to the United States for use as horticultural moss, poultry and stable litter.

“Large quantities of peat were produced in Denmark, Sweden, Holland, Germany, and Russia prior to the war, but no recent production figures are available.

“Price of peat moss varies from \$17.00 to \$42.50 per ton according to location; the average price for the Canadian production in 1944 being about \$24.50 per ton.

“Small amounts of peat fuel have been produced intermittently in Ontario and Quebec. In 1944, machine peat fuel was produced by four operators in Quebec. The total production in Canada was 644 tons valued at \$5,397, the greater part of which came from the property at St. Bonaventure, Yamaska county, Quebec. In Ontario a small amount of peat fuel was made at Gads Hill near Stratford.”

Table 274.—Principal Statistics of the Peat Industry in Canada, 1943 and 1944

	1943	1944
Number of firms.....	(a) 44	(b) 39
Number of plants or bogs.....	44	39
Capital employed.....	\$ 2,477,287	(c) 73
Number of employees—On salary.....	64	1,110
On wages.....	948	
Total.....	1,012	1,183
Salaries and wages—Salaries.....	\$ 119,156	145,653
Wages.....	\$ 881,192	1,008,356
Total.....	\$ 1,000,348	1,154,009
Selling value of products (gross).....	\$ 1,692,444	2,163,376
Cost of fuel and electricity.....	\$ 35,118	48,423
Process supplies used.....	\$ 48,534	46,527
Cost of containers or packing.....	\$ 224,022	288,426
Selling value of products (net).....	\$ 1,384,770	1,780,000

(a) Includes 12 producing fuel.

(b) Includes 6 producing fuel.

(c) Data not collected in 1944.

Table 275.—Number of Firms, Employees, Salaries and Wages, and Peat (Moss and Fuel) Sold or Used, by Provinces, 1943 and 1944

Province	Number of firms	Number of employees	Salaries and wages	Fuel, electricity, process supplies used and cost of containers	Production		
					Tons of peat sold or used		Value (gross)
					As fuel	Moss	
			\$	\$			\$ (**)
1943—							
Quebec.....	18	264	179,230	102,314	522	14,398	391,953
Ontario.....	10	116	110,438	48,020	260	11,120	179,893
Manitoba (a).....	5	120	87,074	59,270	.....	3,087	121,256
British Columbia.....	11	512	623,606	98,070	.....	35,755	999,342
Canada.....	44	1,012	1,000,348	307,674	(b) 782	64,360	1,692,444
1944—							
Quebec.....	18	282	235,848	118,094	444	19,033	363,321
Ontario.....	6	173	169,017	65,769	200	12,491	146,620
Manitoba (c).....	3	129	90,802	41,320	.....	3,128	105,875
British Columbia.....	12	599	658,342	158,193	.....	45,794	1,259,131
Canada.....	39	1,183	1,154,009	383,376	(d) 644	80,446	1,874,950

(a) Contains data for 2 firms in New Brunswick and 1 in Alberta.

(b) Includes 112 tons used by producer.

(**) Includes cost of containers.

(c) Includes 2 firms in New Brunswick.

(d) Includes 38 tons used by producer.

Table 276.—Wage-Earners, by Months, 1942, 1943 and 1944

Month	1942 Total	1943 Total	1944			
			Bog		Dressing Plant	
			Male	Female	Male	Female
January.....	761	737	254	16	250	36
February.....	862	733	289	19	218	41
March.....	850	896	285	14	262	31
April.....	881	582	330	6	243	16
May.....	1,038	842	751	74	234	33
June.....	1,405	1,275	1,338	437	231	13
July.....	2,775	1,349	1,787	504	252	32
August.....	2,297	1,570	1,370	246	264	26
September.....	1,212	1,212	807	79	325	30
October.....	1,110	838	543	11	290	20
November.....	950	801	428	2	258	20
December.....	784	557	299	2	243	34

Table 277.—Peat Fuel Produced in Canada, 1928-1944

Year	Short tons	\$
1928.....	1,497	5,845
1929.....	2,607	13,339
1930.....	2,847	10,932
1931.....	1,674	7,033
1932.....	3,248	7,593
1933.....	1,131	3,449
1934.....	1,878	7,343
1935.....	1,340	5,761
1936.....	1,341	7,376
1937.....	478	2,676
1938.....	620	3,500
1939.....	445	2,445
1940.....	30	75
1941.....	355	2,155
1942.....	172	1,204
1943.....	782	7,000
1944.....	644	5,397

NOTE.—For information of a technical nature, please refer to report No. 614 "Facts About Peat" issued by the Bureau of Mines, Ottawa.

Table 278.—Production (Shipments) of Peat Fuel and Peat Moss in Canada, by Uses and Provinces, 1943 and 1944

Province	Fuel		Moss											
	Tons	\$	Horticulture		Insulation		Poultry and stable litter		Metallurgy		Other uses		Total Moss	
			Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$	Tons	\$ (*)
1943														
Quebec.....	522	4,440	5,898	126,558	125	2,860	8,375	168,889					14,398	298,307
Ontario.....	260	2,560	9,234	85,479			1,886	51,116					11,120	136,595
Manitoba, New Brunswick and Alberta			808	22,574	15	400	2,264	78,138					3,087	101,112
British Columbia.....			8,850	209,877			13,799	359,554	12,974	347,900	132	8,077	35,755	925,408
Total	782	7,000	24,790	444,488	140	3,260	26,324	657,697	12,974	347,900	132	8,077	64,360	1,461,422
1944														
Quebec.....	444	3,597	6,318	118,128	204	5,164	12,457	231,081			54	5,351	19,033	359,724
Ontario.....	200	1,800	7,432	64,847			2,399	57,338			2,660	22,635	12,491	144,820
Manitoba and New Brunswick			978	35,359			2,112	69,688			38	831	3,128	105,878
British Columbia.....			12,830	340,666			23,771	646,938	8,972	250,480	221	21,047	45,794	1,259,131
Total	644	5,397	27,558	559,000	204	5,164	40,739	1,005,045	8,972	250,480	2,973	49,864	180,446	1,869,553

(*) Less cost of containers which were valued at \$224,022 in 1943 and \$288,426 in 1944.

(*) Less cost of containers which were valued at \$224,022 in 1943 and \$238,426 in 1944.
 NOTE.—Data relating to exports of peat moss from Canada were not shown separately in Canadian trade reports prior to 1944; exports of peat moss during 1944 totalled 63,944 short tons valued at \$2,105,370.
 (†) The total of sales for 1944 are not exactly comparable with those for 1943 as the data shown for 1944 are excessively high due to certain duplication arising from the inclusion, in some instances in B.C. producers' reports, of quantities of moss purchased during the year from other moss producers. It is estimated that Canadian sales in 1944, less resale of purchased moss, totalled 63,000 tons valued at \$1,554,000.

Table 279.—Production of Peat Moss in Canada 1941-1944

Year	Short Tons	\$
1941.....	14,345	390,509
1942.....	28,520	658,771
1943.....	64,360	1,461,422
1944.....	(f) 80,446	1,869,553

Prior to 1941 data relating to production of peat moss were included with those of manufactures.

NOTE.—The weight of peat moss shipped varies greatly depending on the moisture content. Weight is used as a unit of measure of production (shipments) owing to the fact that Canadian moss is shipped in various forms, including bales, bags, pads etc., and at present there is no general standardization in Canada as to size of these products. (f) See footnote to preceding table.

THE SALT INDUSTRY

Production of common salt or natural sodium chloride in Canada during 1944 totalled 695,217 short tons valued at \$4,074,021 compared with 687,686 short tons worth \$4,379,378 in 1943. The quantity produced in 1944 was the greatest ever realized by the Canadian salt industry and its value was only surpassed by that of 1943. The mineral in 1944 was produced in Nova Scotia, Ontario, Manitoba and Alberta, and of the total production Ontario contributed 603,806 short tons or 86.9 per cent. Statistics of production represent the recovery of salt from brine wells with the exception of Nova Scotia where the output comes entirely from the underground mining of rock salt deposits.

Of the total salt produced in 1944, there were 370,199 short tons or 53 per cent consumed directly by the producers in the manufacture of caustic soda and other chemicals. Producers' sales of other salt in 1944 included 93,776 short tons of table and dairy grades; 172,275 short tons of common fine, and 55,476 short tons of common coarse. The balance, as shipped by the producers, consisted of various grades, including salt for agriculture and for highway maintenance.

The number of Canadian firms reporting primary salt production in 1944 totalled 8 and plants numbered 9. Employees numbered 710, including 119 females. Salaries and wages amounted to \$1,302,143; \$652,126 were expended for fuel and electricity, and \$134,235 for chemicals and other process supplies.

Statistics relating to Canadian salt production are available only since 1886, and salt output in the Dominion since that year and to the close of 1944 totalled 11,476,121 short tons valued at \$66,367,860. Statistics relating to world production of salt have not been available since 1938. In that year the world production was estimated at 32,000,000 long tons, of which the British Empire contributed 5,200,000 long tons.

Canadian exports of salt in 1944 totalled 3,182 short tons valued at \$80,672; imports during the same period amounted to 147,282 short tons worth \$847,057.

The following information pertaining to recent developments in the salt industry is from a report prepared by the Bureau of Mines, Ottawa:

"At Nappan, near Amherst, Cumberland county, Nova Scotia, a well was drilled in 1931 by Imperial Oil Limited in a search for oil and gas. . . . To obtain further information on this structure the Nova Scotia Department of Mines undertook a drilling campaign in 1943. The results of the drilling gave ample evidence of huge deposits of salt in the district. Maritime Industries Limited, a subsidiary of Standard Chemical Company, Limited, was organized early in 1945 to establish a plant near Amherst for the production of salt from the salt beds in this area.

"Lion Oil Refining Company, of Arkansas State, U.S.A., did some drilling for oil during the summer of 1944 near Mabou, Inverness county, Cape Breton, Nova Scotia. One hole drilled about 7,000 feet proved the existence of several beds of rock salt. The company holds a large acreage in Inverness county and was carrying on geological investigations in this area.

"In New Brunswick a salt basin was discovered in 1921 as a result of drilling in the vicinity of Goutreau, south of Moncton, on the east side of the Petitcodiac river. . . . There are many millions of tons of salt in this basin available for future development.

"An important discovery of salt was made in 1945, 14 miles south of Vermilion, Alberta. The strike was made at a depth of 3,400 feet, and the bed has a thickness of 400 feet. The Waterways salt bed is at a depth of 700 feet with a thickness of 200 feet. Natural gas, which is available at Vermilion, will prove of importance in the development of this new bed."

According to Canadian Chemistry and Process Industries (Toronto), prices for the several grades of salt were as follows in 1944: specially purified (99.9 per cent NaCl) 94 cents per 100 pound lot; industrial fine, in bulk car lots f.o.b. plant, \$6.53 per ton; and industrial coarse \$10.63 per ton.

Table 280.—Production of Salt in Canada, by Grades, 1943 and 1944

	1943			1944		
	Manu- factured	Sold	Value of salt sold (Not including containers)	Manu- factured	Sold	Value of salt sold (Not including containers)
	tons	tons	\$	tons	tons	\$
Table, dairy and pressed blocks.....	100,562	99,706	1,823,446	94,478	93,776	1,847,320
Common, fine.....	164,658	167,547	1,074,229	173,564	172,275	1,124,148
Common, coarse.....	68,106	70,883	451,462	55,969	55,476	479,056
Highway salt.....	269	269 (*)	1,468	293	293 (*)	2,124
Land salt.....	132	157	1,223	108	98	826
Other grades.....	3,044	2,979	43,208	2,980	3,100	45,052
Brine for chemical works (salt equivalent sold or used) (†).....	346,145	346,145	984,342 (*)	370,199	370,199	575,495 (*)
Total.....	682,916	687,686	4,379,378	697,591	695,217	4,074,021
Value of containers.....			809,250			712,063
Grand Total.....			5,188,628			4,786,084

(*) Value partly estimated.

(†) Including dry salt used by producers for manufacture of chemicals.

Table 281.—Production of Salt, by Provinces(*), 1932-1944

Year	Nova Scotia		Ontario		Manitoba		Alberta	
	Tons	\$	Tons	\$	Tons	\$	Tons	\$
1932.....	31,897	150,708	231,138	1,789,751	508	7,092	.....	.....
1933.....	34,278	161,889	244,107	1,755,087	1,499	18,388	.....	.....
1934.....	42,886	191,917	276,751	1,734,196	1,664	20,137	.....	.....
1935.....	38,701	161,659	320,003	1,698,598	1,538	18,765	.....	.....
1936.....	38,774	183,915	350,044	1,557,078	2,498	32,151	.....	.....
1937.....	47,865	216,401	407,701	1,533,599	3,391	43,465	.....	.....
1938.....	44,950	194,759	388,130	1,657,140	2,920	34,979	4,045	46,035
1939.....	47,885	213,029	370,843	2,200,189	2,453	35,888	3,319	37,526
1940.....	42,495	220,328	412,401	2,371,780	3,076	45,731	6,742	135,430
1941.....	54,007	307,637	477,170	2,512,166	13,051	115,367	16,617	260,995
1942.....	50,199	317,798	558,407	2,793,328	22,706	397,101	22,360	335,960
1943.....	47,775	245,157	594,889	3,356,870	27,523	497,227	17,499	280,124
1944.....	38,809	281,482	603,806	2,906,117	27,267	488,776	25,335	397,646

(*) In addition, Saskatchewan produced 231 tons valued at \$4,510 in 1933, 452 tons at \$8,703 in 1934, and 101 tons at \$2,046 in 1935.

Table 282.—Salt Produced for Chemical Purposes(*), 1928-1944

Year	Quantity Tons (2,000 lb.)	Per cent of total salt output	Year	Quantity Tons (2,000 lb.)	Per cent of total salt output
1928.....	135,138	45	1937.....	205,149	45
1929.....	168,327	51	1938.....	170,938	39
1930.....	114,737	42	1939.....	187,958	44
1931.....	97,958	38	1940.....	224,009	48
1932.....	95,242	37	1941.....	258,711	46
1933.....	104,740	39	1942.....	327,543	50
1934.....	124,132	40	1943.....	346,145	50
1935.....	145,433	40	1944.....	370,199	53
1936.....	165,882	42			

(*) Used in the manufacture of chemicals by producers of salt.

Caustic soda, chlorine and hydrochloric acid are now manufactured by Canadian Industries Limited from salt obtained from the company's wells located at Sandwich. This company operates chemical plants at Windsor, Cornwall, Shawinigan Falls and Quebec.

The Brunner Mond Canada, Limited, located at Amherstburg, Ontario, manufactures soda ash from natural brine; calcium chloride is also recovered as a byproduct by this company.

Table 283.—Production in Canada, Imports, Exports and Consumption of Salt, 1943 and 1944

	1943		1944	
	Tons	Value	Tons	Value
		\$		\$
Production.....	687,686	4,379,378	695,217	4,074,021
Imports—				
Salt, for the use of the sea or gulf fisheries.....	21,037	161,255	31,458	173,123
Salt, in bulk, n.o.p.....	47,687	245,913	91,358	461,953
Salt, n.o.p., in bags, barrels, etc.....	16,064	181,940	24,466	211,981
Total.....	84,788	589,108	147,282	847,057
Exports.....	8,061	118,174	3,182	80,672
Apparent consumption of salt.....	764,413	4,850,312	839,317	4,840,406

Table 284.—Available Statistics on Consumption of Salt, in Specified Canadian Industries, 1943 and 1944 (*)

Industry	1943		1944	
	Quantity used	Cost at works	Quantity used	Cost at works
	Pounds	\$	Pounds	\$
Fish canning and curing (factories only).....	48,349,100	528,320	46,592,800	536,865
Slaughtering and meat packing.....	120,899,226	859,676	138,042,530	943,941
Acids, alkalies and salts—Brine (salt content) and dry salt.....	756,465,273	933,623	677,551,896	926,845
Soaps and cleaning preparations.....	3,864,220	19,203	3,591,531	20,858
Dyeing, cleaning and laundry work.....	6,234,358	56,024	6,915,387	63,612
Dyeing and finishing of textiles.....	7,611,943	33,834	3,405,703	18,901
Artificial ice.....	549,990	4,516	687,200	5,419
Abrasives—Artificial.....	820,000	4,793	686,000	3,858
Waterworks.....	4,821,900	(a)	(b) 5,000,000	(a)
Leather tanneries.....	16,859,409	88,867	18,178,471	98,314
Pulp and paper mills.....	28,546,000	136,642	30,458,000	150,030
Stock and poultry foods.....	13,386,000	106,991	22,516,000	182,653
Bread and other bakery products.....	16,978,891	199,602	16,956,443	208,371
Fruit and vegetable preparations.....	11,599,260	83,370	18,166,054	128,640
Biscuits, confectionery, etc.....	2,158,560	23,103	2,207,959	22,352
Foods, breakfast.....	3,024,751	18,821	1,654,457	14,185
Sausage and sausage casings.....	612,884	9,097	608,466	8,784
Ice cream industry.....	393,817	9,806	306,095	2,273
Breweries.....	701,867	6,744	800,790	6,894
Malt and malt products.....	305,185	1,729	331,830	1,963
Macaroni, vermicelli, etc.....	136,203	1,447	96,572	1,059
Ice cream cones.....	8,460	78	8,132	58
Foods, miscellaneous, including coffee, tea, etc.....	4,110,262	43,447	4,575,569	48,210
Butter and cheese.....		239,184		223,729
Starch and glucose.....	553,268	2,633	475,245	2,291
Animal oils and fats.....	428,000	2,134	340,000	1,723
Condensed milk.....		330		297
Cheese processed.....	299,809	5,339	270,467	4,037

(*) In addition, large quantities of salt are used on highways.

(a) Data not available.

(b) Estimated.

Table 285.—Principal Statistics of the Salt Industry in Canada, 1942-1944

	1942	1943	1944
Number of firms (*).....	9	9	9
Capital employed..... \$	5,687,511	5,490,594	(†) 146
Number of employees—On salary.....	134	135	564
On wages.....	541	547	
Total.....	675	682	710
Salaries and wages—Salaries..... \$	337,050	366,555	397,113
Wages..... \$	777,524	856,454	905,030
Total..... \$	1,114,574	1,223,009	1,302,143
Selling value of products (gross)..... \$	4,604,003	5,188,628	4,786,084
Cost of purchased process materials..... \$	133,783	134,272	134,235
Cost of fuel and electricity..... \$	536,649	596,252	652,126
Value of containers..... \$	748,816	899,250	712,063
Net value of sales..... \$	3,184,755	3,648,854	3,287,660

(*) 6 in Ontario; 1 in Nova Scotia; 1 in Manitoba; 1 in Alberta.

(†) Data not available.

Table 286.—Wage-Earners, by Months, 1940-1944 (On last day of each month or nearest work day)

Month	1940	1941	1942	1943	1944		
					Male		Female
					Surface	Under-ground	Surface
January.....	431	428	515	545	470	30	61
February.....	439	435	526	535	468	28	59
March.....	442	449	516	543	459	30	57
April.....	463	484	522	537	455	30	61
May.....	490	516	539	534	467	31	58
June.....	477	543	560	542	484	32	58
July.....	493	558	565	562	480	29	57
August.....	503	564	548	566	479	30	57
September.....	490	565	548	539	481	28	56
October.....	483	574	542	541	479	29	64
November.....	492	563	569	551	486	31	65
December.....	396	556	545	560	485	30	55
Average.....	466	520	541	547	474	30	60

POTASH

Complete statistics relating to world production of potash are not available as publication of potash production statistics by European governments virtually ceased in the summer of 1939, and no adequate data are available since.

Natural potash salts are not yet mined or recovered on an extensive commercial scale in Canada. Potash occurs in small quantities in rock salt strata at Malagash, Cumberland county, Nova Scotia, and at Gautreau, Westmorland county, New Brunswick. Potassium chloride occurs at Malagash in a number of definite bands in the salt mass in the form of crystalline beds of pink and yellowish green sylvite in the matrix of halite.

Table 287.—Potash Salts Used in the Manufacture of Canadian Mixed Fertilizers, 1943 and 1944

	1943		1944	
	Tons	Cost at works	Tons	Cost at works
		\$		\$
Nitrate of potash.....		447,619	16	1,198
Kainite and potash manure salts.....	23,753	447,619	17,735	415,722
Muriate of potash.....	51,500	1,969,055	52,893	2,080,766
Sulphate of potash.....	5,480	248,702	5,850	252,521

Table 288.—Sales of Potash Salts for Fertilizer Purposes, Other Than for the Manufacture of Mixed Fertilizers, Years Ended June 30, 1943 and 1944

	1943		1944	
			(short tons)	
Muriate of potash.....	5,376		4,924	
Sulphate of potash.....	99		148	

	1943		1944	
		\$		\$
IMPORTS—				
Kainite and German potash salts and German mineral potash.cwt.	423,091	148,203	351,434	133,527
Potash, muriate of, crude.....cwt.	1,040,175	1,336,144	1,321,909	1,657,758
Potash sulphate of, crude.....cwt.	88,218	159,549	87,380	158,164
Total potash and potassium compounds n.o.p.....pound	6,796,047	636,654	6,175,771	640,024

TALC AND SOAPSTONE INDUSTRY

The value of crude and refined talc and soapstone sold by Canadian producers of these minerals totalled \$357,249 in 1944 compared with \$266,685 in 1943. Mine shipments of soapstone and talc reported in 1944 by operators in the province of Quebec amounted to 19,013 short tons valued at \$204,127. Production of the higher grades of talc in Canada is confined chiefly to the province of Ontario, and in 1944 shipments totalling 13,584 tons worth \$153,122 were made entirely from a deposit located near Madoc, Hastings county. In British Columbia, crude talc imported from the United States is treated in a mill at Vancouver. Canadian Wartime Metals Corporation discontinued operations on February 29, 1944 at its Lava Talc project located at the Red Mountain and Gold Dollar claims in the Golden mining division of British Columbia; approximately seven tons of sawn talc blocks were shipped to the United States for experimental purposes.

Imports of talc or soapstone into Canada during 1944 totalled 6,094 short tons valued at \$130,603; this came entirely from the United States. Exports of talc from Canada in 1944 amounted to 11,920 short tons worth \$157,178.

During 1944 there were 6 firms reported as active in the industry, 4 in the province of Quebec, 1 in Ontario and 1 in British Columbia. Employees numbered 113 and \$133,883 were distributed in salaries and wages. Fuel and purchased electricity consumed were appraised at \$27,642 and the cost of explosives and other process supplies used was reported at \$40,523. The net value of sales in 1944 was estimated at \$289,084 compared with \$208,654 in 1943.

The following information is from a report prepared by the Bureau of Mines, Ottawa:

"Ontario supplies all of the prime white powdered talc produced, Quebec furnishing off-colour ground talc (in part made from soapstone waste), sawn dimension soapstone, and talc crayons. In recent years, the total output of ground talc of all grades has been about equally divided between these two provinces, with annual shipments averaging between 12,000 and 15,000 tons each.

"Canada is self-sufficient in respect to most of the grades of ground talc needed for its industrial requirements, and there is a considerable surplus for export. It also produces most of the sawn dimension soapstone and talc crayons used, but is dependent on imports, obtained mainly from the United States, for certain special qualities of ground talc demanded by the ceramic, paint, and cosmetic trades. Imports of such talc in 1942 and 1943 amounted to approximately one-third of the total domestic consumption of about 15,000 tons.

"Following the outbreak of war, a substantial demand for Canadian talc developed in the British market, to supply deficiencies caused by the cutting off of imports from France, Italy and

Norway. In 1943, all forms of talc, soapstone, and pyrophyllite were placed under strict control and allocation by the British Government, with all purchases and imports to be made for Ministry of Supply account.

"In Ontario, all the output comes from the Madoc area, in Hastings county, where production commenced some 40 years ago.

"In Quebec, the entire production is obtained from the Eastern Townships, mainly from the Thetford Mines area, and there are also a mine and mill at Highwater, close to the Vermont boundary. All of Canada's output of sawn soapstone blocks comes from the Thetford Mines area.

"Owing to the critical need for additional sources of massive, steatitic talc, investigations were made during 1943 and 1944 by Wartime Metals Corporation, a Crown company, of an occurrence of such material near Red Earth Creek in Kootenay Park, British Columbia, but it was decided that the recovery of usable material was too low to justify further work.

Samples of yellow steatite from a deposit at the base of Mt. Whymper, several miles south of the above occurrence, were forwarded to the United States for test, but the material proved to be too badly flawed to be usable.

"Ground talc has a wide variety of uses, but much the greater part of the output is employed in the paint, roofing, paper, rubber, and ceramic industries. It is used, also, in foundry facings, bleaching fillers for textiles, cosmetics and pharmaceuticals, soaps and cleansers, insecticides, polishes, plastics, and for rice polishing. Talc is also reported to be of value as a fertilizer.

"Ceramic uses for talc have shown the most noteworthy increase, and it is now a standard ingredient in floor and wall tile, electrical and other porcelains, porcelain enamels, dinnerware bodies, and refractories. For rubber, talc is employed mainly for the dusting of moulds and finished products. It is of value, also, as a body-reinforcing ingredient, to impart toughness and to increase tensile strength, particularly in cable insulation.

"The Canadian consumption of ground talc in 1943, as reported by users, totalled 17,201 tons, distribution, by industries, being as follows: paints, 34 per cent; roofing products, 23 per cent; rubber, 11 per cent; pulp and paper, 9 per cent; cosmetic and pharmaceutical preparations, 7 per cent; insecticides, 5 per cent; soaps and cleansers, 3 per cent; miscellaneous, 8 per cent. Consumption of soapstone furnace blocks by Canadian pulp and paper mills in the same year was 1,076 tons, equivalent to 11,956 cubic feet.

"Steatite is the mineralogical name given to compact, massive talc, having no visible grain, that can be sawn, turned, drilled, and otherwise machined into any desired form. Such material has been widely used for the production of fired shapes, used mainly as electrical insulators. There is now a large demand for steatite for use as grid spacers in high-frequency ship and tank radio transmitters, and for the cores, bushings, resistors, etc., in radio, radar, and other electronic equipment. It is used to an important extent also for carbon black and other gas burner tips. An alternative trade name for steatite is "lava talc". Because of the small amount of natural steatite available, its high cost, and excessive machining and firing losses, the aforementioned articles are now made largely by die-pressing powdered talc. Suitable talc for the purpose is required to be high-grade material, low in lime and iron, and such talc is commonly termed steatite, or steatitic talc, irrespective of its texture. There is still a limited demand, however, for sawn steatite shapes, and suitable crude is in short supply; the chief sources are British India, Sardinia, Maryland, Montana, and California. Specifications call for compact texture, good structural strength, freedom from hair-cracks and parting lines and from gritty impurities, and a low content of lime and iron. In general, grade and suitability are determined by machinability and firing behaviour, followed by tests for electronic performance. Chemical analysis is of secondary importance.

"Soapstone, a soft greenish rock containing a high percentage of talc, is used extensively in the form of sawn blocks and bricks for lining the alkali recovery furnaces and kilns of kraft pulp and paper mills. It is also used for brick and slab liners for fireboxes, and ovens, and for

switchboard panels, laboratory benches, etc. Considerable quantities of soapstone quarry and sawing waste are ground and marketed as low-grade talc to the rubber, roofing, foundry, and other trades.

"Compact, massive talc, sawn into square pencils and slices, is an important material for steelmakers' crayons. Recent shortages of suitable raw material have led to the introduction of extruded crayons compounded of ground talc with a suitable binder.

"Ground talc has a wide price range. Value is dependent upon purity (determined by freedom from lime and gritty or iron-bearing substances, slip, and colour), particle shape, and fineness of grinding, the specifications for which vary in the different consuming industries. Roofing and foundry talcs are the cheapest grades, the users being satisfied with coarser, grey or off-colour material, often soapstone powder or sawing dust, which sells at about \$5 to \$7 a ton f.o.b. rail. Domestic grey talc, suitable for roofing, rubber, and paper use, sold in 1944 for \$8 to \$11.75 a ton, according to fineness. White talc from Madoc, Ontario, was quoted at \$8 to \$10 for the coarser grades, \$12 to \$18 for finer mesh sizes, and \$44 for minus 400-mesh material.

"Canadian ground talc or soapstone exported to the United States is dutiable at 17½ per cent ad valorem on material valued at not over \$14 a long ton, and at 35 per cent on material valued at over \$14 a ton. The duty on crude material is one-quarter cent a pound, whereas cut soapstone or talc, in the form of bricks, crayons, blanks, etc., is dutiable at one cent a pound. Talc, ground or unground, enters Canada under the British Preferential tariff at 15 per cent ad valorem, and under the Intermediate and General tariff at 25 per cent; imports from the United States are dutiable at 20 per cent.

"**Pyrophyllite.**—Pyrophyllite (hydrous silicate of alumina) closely resembles talc in appearance and physical characteristics. It is difficult to distinguish from talc even by microscopic means and often requires chemical analysis for its identification. In the ground state it can be employed for many of the industrial uses of talc. When fired, pyrophyllite does not flux, as does talc, and it is of value in a wide range of high-grade ceramic products, including refractories.

"Commerical deposits are relatively scarce. Most of the recorded world production comes from North Carolina, where the industry has expanded rapidly in recent years. Sales of pyrophyllite in the United States in 1944 comprised 5,683 tons of crude valued at \$52,343, and 60,560 tons of ground valued at \$504,739, a total of 66,243 tons valued at \$557,082. A new important use for the mineral is as a carrier in DDT personnel insecticidal dusts, and in agricultural insecticides generally.

"In Canada, some rather low-grade, sericitic pyrophyllite occurs at Kyuquot Sound on the west coast of Vancouver Island. A small quantity was shipped from these deposits about 30 years ago for use in refractories and cleanser products.

"Important deposits are known in Newfoundland, and are owned and operated by Industrial Minerals Company of Newfoundland Limited, Box 435, St. John's, which shipped about 500 tons of ground material in 1942 and 1943. In 1944, shipments declined to 140 tons.

"In 1944, pyrophyllite was quoted at \$10 to \$13 a ton, f.o.b. North Carolina mills, for 200-mesh and 325-mesh material, respectively.

Table 289.—Production (Sales) in Canada of Talc and Soapstone(†), 1942-1944

	1942		1943		1944	
	Quantity	Value	Quantity	Value	Quantity	Value
	tons	\$	tons	\$	tons	\$
Soapstone (Quebec) (*).....	14,369	136,529	14,204	135,469	19,013	204,127
Talc (Ontario).....	15,499	174,295	11,959	131,216	13,584	153,122
Total Canada.....	29,868	310,824	26,163	266,685	32,597	357,249

(*) Shipments by some firms usually include a considerable quantity of material classified as talc.

(†) Includes both crude and milled grades.

Table 290.—Production of Talc and Soapstone in Canada, 1930-1944

Year	Value	Year	Value
	\$		\$
1930.....	186,216	1938.....	144,848
1931.....	157,083	1939.....	170,066
1932.....	159,038	1940.....	229,639
1933.....	190,836	1941.....	360,809
1934.....	180,777	1942.....	310,824
1935.....	171,532	1943.....	266,685
1936.....	177,270	1944.....	357,249
1937.....	163,814		

Production of talc and soapstone in Canada from 1886 to the end of 1944 totalled 610,429 short tons valued at \$5,752,039. The largest annual tonnage produced during these years was 34,632 in 1941, also, the greatest annual value was \$360,809 in 1941.

Table 291.—Consumption of Talc in Canada, by Industries, as Reported in the Annual Census of Manufactures, 1943 and 1944

Industry	1943		1944	
	Short tons	Cost at works	Short tons	Cost at work
		\$		\$
Rubber industry.....	1,839	34,243	2,507	46,780
Electrical apparatus.....	356	9,891	200	5,273
Paints.....	6,601	174,757	6,212	201,236
Soaps and cleansing preparations.....	550	10,556	608	16,238
Toilet preparations.....	565	24,868	1,451	80,566
Polishes.....	25	496	17	408
Products from imported clays.....	354	5,586	535	8,564
Prepared roofing.....	3,859	42,519	4,629	51,204
Pulp and paper.....	1,469	25,178	5,202	96,395

Table 292.—Imports and Exports of Talc, 1943 and 1944

	1943		1944	
	Pounds	\$	Pounds	\$
IMPORTS—				
Talc or soapstone.....	12,899,800	130,813	12,187,100	130,603
EXPORTS—				
Talc.....	22,729,200	146,516	23,840,000	157,178

Table 293.—Principal Statistics of the Talc and Soapstone Industry, in Canada, 1942-1944

	1942	1943	1944
	(a)	(b)	(c)
Number of firms.....	10	8	6
Capital employed.....	\$ 567,665	576,691	(d)
Number of employees—On salary.....	8	10	14
On wages.....	107	80	99
Total.....	115	90	113
Salaries and wages—Salaries.....	\$ 22,729	23,794	29,532
Wages.....	90,872	77,925	104,351
Total.....	\$ 113,601	101,719	133,883
Selling value of products (Gross).....	\$ 310,824	266,685	357,249
Cost of fuel and purchased electricity.....	25,905	24,104	27,642
Cost of explosives and other process supplies.....	33,208	33,927	40,523
Selling value of products (net).....	251,711	208,654	289,084

(a) 7 firms in Quebec and 3 in Ontario; data for 1 firm in Quebec, other than sales not available.

(b) 5 firms in Quebec, 2 in Ontario and 1 in British Columbia.

(c) 4 firms in Quebec, 1 in Ontario and 1 in British Columbia.

(d) Data not collected in 1944.

Table 294.—Wage-Earners(*), by Months, 1943 and 1944

Month	Total 1943	1944		
		Surface	Under- ground	Mill
January.....	84	47	22	21
February.....	80	41	25	21
March.....	76	46	20	24
April.....	71	66	19	21
May.....	76	47	18	25
June.....	78	74	18	26
July.....	68	60	16	26
August.....	77	59	18	25
September.....	75	49	15	34
October.....	79	52	15	31
November.....	93	55	17	33
December.....	88	35	14	36

(*) All male.

MISCELLANEOUS INDUSTRIAL OR NON-METAL MINING INDUSTRIES

Included in this section are the following non-metallic minerals and mineral products:—

Barite	Graphite	Phosphate
Brucite	Grindstones	Silica Brick
Corundum	Kyanite	Sodium Carbonate
Diamonds	Lithium Minerals	Sodium Sulphate
Diatomite	Magnesitic Dolomite	Strontium Minerals
Fluorspar	Magnesium Sulphate	Sulphur (Pyrites)
Garnet	Natural Mineral Waters	

Canadian operators producing certain industrial minerals, and who are usually relatively few in number, have been segregated for statistical purposes into a single group designated as the Miscellaneous Industrial or Non-Metallic Minerals Industry. Minerals or primary mineral products produced (or deposits developed) by this industry during 1944 included barite, brucite, diatomite, fluorspar, graphite, grindstones, magnesitic-dolomite (crude and refined), mineral waters, phosphate, silica brick, sodium carbonate and sodium sulphate. For convenience, the sulphur content of pyrites shipped and sulphur recovered from smelter gas are recorded with the various miscellaneous minerals listed above; the value of sulphur production, however, is not included in the total for the miscellaneous non-metallic or industrial minerals as the value of this element is credited to the copper-gold-silver mining and non-ferrous smelting industries.

The number of firms reported as active in the industry during 1944 was 50; employees numbered 865 and salaries and wages paid amounted to \$1,500,250. The cost of fuel, purchased electricity, containers and process supplies used during the year was reported at \$1,188,860, and the gross value of production totalled \$3,986,579 compared with \$3,476,707 in 1943.

“**Barite.**—Production of barite in Canada in 1944 was nearly five times greater than in 1943, the previous record year, and exceeded by a considerable margin the entire output from 1885 to the end of 1943. Sales by primary producers comprised both crude ore and ground material.

“For the first time in years crude barite was in demand for export. Shortages in the United States of crude lump for barium chemicals and lithopone, and of drilling, glass, and pigment grades, served to direct attention to Canada as a source of supply. The shortages were first in evidence in 1943 and were accentuated throughout 1944 by increased military demands for barite for use in camouflage paints and by the labour scarcity. As a result, contracts were negotiated by the U.S. War Production Board in 1944 for shipments of 60,000 tons of Nova Scotia barite to American consumers, 50,000 tons of which was to be crude ore and 10,000 tons ground material, the order to be completed by February, 1945. A substantial

domestic market for crude ore also developed for use as permanent ballast in maintenance ships being built in West Coast yards, and nearly 12,000 tons was supplied for this purpose. Most of the ground barite produced was exported for use in oil well drilling in Trinidad, Venezuela, and other South American countries. In April, the U.S. War Production Board placed barite in the group of minerals the supply of which was insufficient to satisfy war plus essential industrial demands, and it was moved up into Group I and continued there for the remainder of the year.

"For the past several years the production of barite in Canada has been confined to Nova Scotia and British Columbia, the source of supply in Nova Scotia being the deposit of Canadian Industrial Minerals, Limited, at Walton, in Hants county. In British Columbia, output in 1944 came from a property at Parson, 25 miles south of Golden, that was operated by R. A. Thrall.

"The fluorspar ores of the Madoc area, Ontario, and of a deposit at Lake Ainslie in Nova Scotia, contain important amounts of barite. The latter deposit was operated in 1942 and 1943 and a small tonnage of hand-picked barite has been stockpiled. Tests by the Bureau of Mines, Ottawa, on ores from the Madoc and Lake Ainslie areas indicate the possibility of recovering a marketable barite product from them by flotation. Canadian Industrial Minerals, Limited did some exploratory work on the Lake Ainslie property in 1944, and on another barite deposit near Brookfield, Colchester county, Nova Scotia, under option agreements.

"World production of barite prior to the war was close to one million tons a year, of which Germany supplied 50 per cent and the United States 30 per cent. The remainder came mainly from the United Kingdom, Italy, Greece, France, and India.

"Crude lump barite is used in the manufacture of lithopone, an important white pigment and filler material, and in a wide range of barium chemicals. For these trades, barite is required to contain 95 to 96 per cent BaSO_4 , and not more than 3 per cent SiO_2 and 1 per cent Fe_2O_3 . The ore should be furnished crushed to $1\frac{1}{2}$ -inch size. There is little manufacture of the above products in Canada, but they are produced on a large scale in the United States, where, in 1944, 34 per cent of the total barite used was employed for such purposes.

"For most other industrial uses barite is employed in finely ground form, 325 mesh being the general specification. The material should be of good white colour, the best grades being obtained by wet-grinding, bleaching with acid, and water-floating. Some off-colour material is used for less exacting purposes. Content of BaSO_4 is usually required to be not less than 95 per cent. Chief uses for ground barite are as a heavy, inert filler or loader in rubber, asbestos products, paper, linoleum and oilcloth, textiles, leather, and plastics. It is one of the leading pigments and extenders in paints, and in recent years has become of increasing importance as a heavy weighting medium in oil-well drilling muds, to overcome gas pressures. Colour is immaterial in barite for the last-named use, the requirements for which are a minimum specific gravity of 4.25 (corresponding to a BaSO_4 content of 93 per cent) and absence of soluble salts. The glass trade also uses considerable barite as a batch fluxing ingredient for moulded flint glass. For this purpose, it should contain not less than 96 per cent BaSO_4 , under 3 per cent moisture, and not more than 0.4 per cent iron oxide (Fe_2O_3), with a fineness in the range of 20 to 190 mesh.

"Consumption of ground and crushed barite in Canada in 1943, as reported by users, was 3,732 tons, distributed among the following trades: paint, 2,760 tons; rubber, 434 tons; glass, 290 tons; linoleum, 109 tons; wallpaper, 15 tons; miscellaneous, 124 tons. Shipments from Canadian mines for domestic use totalled 2,569 tons, which, plus imports of 1,686 tons, and less changes in consumers' stocks of 203 tons, showed an apparent total consumption of 4,052 tons.

"Distribution of the 510,000 tons of primary barite consumed in 1944 in the United States was as follows: oil-well drilling, 54 per cent; barium chemicals and lithopone, 34 per cent; fillers, loaders, and pigments, 7 per cent; glass, 5 per cent.

"Barium carbonate is the principal intermediate salt used in the manufacture of other barium chemicals. It is also employed to prevent the unsightly white efflorescence ("scumming") in bricks and other heavy clay products, and for case-hardening of steel. Important military uses for it, and for the nitrate, are in making green flares, tracers, incendiary bombs, shell primers, etc. Blanc fixe, or precipitated barium sulphate, is used in white paints, rubber, linoleum, and oilcloth. Barium chloride is used to purify salt brines for the manufacture of chlorine and sodium hydroxide; in making coatings for photographic paper; as a flux in the production of magnesium alloys; as an extender in titanium pigments; in colour lakes; in finishing white leather; and in the purification of beet sugar. Barium hydroxide, also, is used in the refining of sugar and of animal or vegetable oils; and the peroxide, in making hydrogen peroxide.

"Barium metal has only limited industrial applications. It is used as a wire coating to remove traces of gas in radio, vacuum, and thermionic tubes, and to coat steel balls in the rotating anodes of X-ray tubes. Alloys of barium with lead and calcium ("Frary" metal) are used for bearings; and nickel-barium alloys for corrosion-resistant sparkplug electrodes. Nickel coated with barium oxide can replace tungsten to advantage for the cathodes of the smaller types of electron tubes, giving a high yield of electrons per watt of heating energy.

"Of interest is the announcement made in 1944 by the Laprairie Company, 906 University Tower Building, Montreal, of a method of employing the intermediate compound, barium sulphide or "black ash", made by roasting barite with coal, as a substitute for barium carbonate to prevent scumming in bricks. The black ash is introduced into the pugging water in solution, and is stated to be three times as effective as the same weight of carbonate.

"Canadian quotations in 1944 for crude barite remained unchanged at around \$7 per short ton, f.o.b. mines. Domestic ground white barite for pigment and filler use sold at \$32 to \$40 per ton, f.o.b. works, according to quality, whereas prime white imported was quoted at \$50, and off-colour at \$46. Ground off-colour domestic averaged around \$12.80 per short ton, f.o.b. Atlantic port.

"In the United States, Georgia crude was quoted at \$8.50 to \$9 per long ton, f.o.b. mines. Missouri crude, which in the first quarter sold at \$6.75 to \$7.50, according to grade, rose to \$8.25 to \$8.50 in the latter part of the year. In the American market, crude barite is usually sold on a penalty-premium basis, a content of 95 per cent BaSO_4 and 1 per cent Fe_2O_3 being considered standard. A premium or penalty of 25 cents per short ton is set for each per cent of barium sulphate above or below 95 percent, and a similar premium or penalty for each 0.1 per cent of Fe_2O_3 below or above 1 per cent.

"The United States imposes a duty of \$4 per ton on crude barite, and \$7.50 per ton on ground or otherwise manufactured material. Barite enters Canada free under the British preferential tariff: imports from other countries pay 25 per cent ad valorem.

"Witherite (natural barium carbonate) is the only other barium mineral of commerce. Commercial deposits are rare and no occurrences of economic interest are known in Canada. Most of the world supply is derived from England." (Bureau of Mines, Ottawa)

Table 295.—Production of Barite in Canada, 1913-1944

Year	Short tons	\$	Year	Short tons	\$
1913.....	641	5,410	1927.....	56	1,268
1914.....	612	6,169	1928.....	127	2,847
1915.....	550	6,875	1929.....	105	2,341
1916.....	1,368	19,393	1930.....	66	1,484
1917.....	3,490	54,027	1931.....	16	363
1918.....	640	10,165	1932.....	20	60
1919.....	468	8,154	1933.....	323	3,639
1920.....	751	22,983	1939.....	338	4,819
1921.....	270	9,567	1940.....	6,890	74,418
1922.....	289	9,537	1941.....	19,667	183,144
1923.....	409	8,548	1942.....	24,474	279,253
1924.....	151	3,308	1943.....	118,719	1,023,696
1925.....	95	2,259	1944.....		
1926.....	100	2,307			

Table 296.—Barite and Blanc Fixe Used by the Canadian Paints, Pigments and Varnishes Industry in Canada, 1931-1944

Year	Barite		Blanc Fixe (*)	
	Pounds	\$	Pounds	\$
1931.....	2,304,119	39,361	146,025	12,915
1932.....	2,064,303	35,138	23,353	817
1933.....	2,062,957	33,578	47,793	1,471
1934.....	2,393,330	44,690	93,918	2,481
1935.....	2,308,628	43,702	141,975	4,223
1936.....	2,533,275	41,687	97,016	3,148
1937.....	2,630,366	42,821	125,743	4,136
1938.....	2,729,212	46,288	116,545	3,287
1939.....	2,884,985	49,659	139,408	4,455
1940.....	3,281,747	71,492	99,422	3,873
1941.....	4,906,829	112,760	169,583	8,010
1942.....	6,833,584	150,927	104,948	5,328
1943.....	5,519,352	121,727	87,369	4,441
1944.....	3,942,037	90,485	182,690	10,068

(*) Artificial barium sulphate.

Table 297.—Imports and Exports of Barite and Specified Commodities, 1943 and 1944

	1943		1944	
	Pounds	\$	Pounds	\$
IMPORTS—				
Blanc fixe.....	345,536	16,694	549,220	22,686
Lithopone.....	17,754,879	857,507	18,999,905	932,787
Barite.....	3,372,500	43,239	3,648,600	47,913
EXPORTS—				
Barite.....	Data not shown separately in Trade Reports			

“Corundum.—As a result of circumstances arising from the war, there was a revival of activity in the production of corundum in Canada in 1944. It was the first recorded output of the mineral in the Dominion since 1921, and the five car lots of concentrate produced were obtained from the treatment of tailings at the Craigmont property in Renfrew county, Ontario. The concentrate was shipped to American Abrasive Company's plant in Westfield, Massachusetts, for grinding and for the preparation of fine powders and flour. Wartime Metals Corporation, of Montreal arranged to treat the tailings at the request of the United States Government, which has been encountering difficulties in obtaining supplies from the Transvaal in South Africa in sufficient quantities to meet the requirements. The 125,000 tons of tailings available at the Craigmont property are estimated to have a corundum content of about 3 per cent. A 200-ton gravity mill equipped with a magnetic separator was erected by Wartime Metals Corporation, close to the site of the old Craig mill early in 1944 and shipments of concentrate to Westfield were commenced in the autumn of that year.

“Corundum (Al_2O_3), the oxide of aluminium, usually occurs as bronze-coloured barrel-shaped crystals. It is fairly heavy, and has a hardness (Mohs' scale) of 9, being the hardest known mineral next to diamond (hardness 10).

“All of the Canadian production of corundum has come from a corundum-bearing belt of nepheline syenite that passes in a northeast direction throughout the southeast, northern, and central parts respectively, of Haliburton, Hastings, and Renfrew counties in Ontario, and about 82 per cent of the total output to date has come from the Craigmont property, the chief source of the remainder being the Burgess deposits, about 5 miles to the west. The belt is about 100 miles long and 6 miles wide and is the most northerly of three belts of syenites in which corundum is known to occur. The middle belt is in Methuen and Burleigh townships, Peterborough county, and the southern belt, 65 miles to the east, is in Frontenac county. A deposit of corundum in the French River area northeast of Georgian Bay was prospected in 1943, the results of which work indicated that the corundum content is much below commercial grade.

"As noted above, Canada produced a few carloads of corundum in 1944, but from 1901 when production was commenced until about 1915 the Dominion was the leading producer of the mineral, and from 1901 to 1918 inclusive, a total of 370,000 tons of ore was treated. From this, 19,000 tons of concentrate valued at \$2,024,000 was shipped. The ore came mainly from numerous open cuts on the present Craigmont property, some of which are over 600 feet long and 250 feet wide. The workings, known as the Craig and Klondike cuts, are on the south and west slopes of Robillard Mountain. During the early part of this continuous period of operation the ore milled had a corundum content of 10 per cent, but that milled near the end of the operations had a content of only 4 per cent. A total of about 26,000 tons of mill tailings was re-treated during 1920 and 1921, from which 600 tons of concentrate valued at \$80,500 was shipped.

"Canada imported only a small quantity of corundum in 1944. The imports included a small amount of flour corundum that was prepared at Westfield, Mass. Certain physical and structural qualities of the minute grains of natural corundum make it preferable to those of the artificial abrasive for the purposes for which it is used.

"Most of the world production of the mineral during the past 25 years has come from the Transvaal, Union of South Africa, from which an output of from 4,000 to 7,000 tons a year has been obtained since 1940, though production has been declining since 1942, the peak year. All of the output is exported, mainly to the United States. Production from Russia in recent years is said to have been large, but no statistics are available. Production from India and Madagascar has been intermittent. In the United States there was no production of corundum in 1944, but the erection of a mill is planned on a deposit in Gallatin county, Montana, from which a small annual output was maintained between 1902 and 1905. During 1943 and 1944 a careful re-examination was made of the known corundum deposits in the United States, most of which were last worked 40 to 50 years ago. As a result of these investigations some corundum was produced near Clover in South Carolina in 1943, but operations were discontinued in the same year.

"In the Transvaal, most of the output has been in the form of "Crystal" that occurs as loose crystals of corundum in shallow alluvial deposits or "paddocks" that are formed by the disintegration of corundiferous rock. The crystals are mined intermittently, mainly from small open cuts, by a large number of "diggers", and are washed on screens that are revolved by hand. The deposits are small and are unevenly distributed over a wide area in the Zoutpansberg and Pietersburg districts of northern and eastern Transvaal. In the spring of 1944 a modernly equipped mill was erected at Pietersburg for the concentration of reef corundum, or plumasite, that occurs in veins of feldspathic dykes, somewhat similar to the Craigmont deposit in Canada. The mill is in steady production and the concentrate is exported.

"Until recently, corundum was used chiefly for the abrasive grit in grinding wheels required for special types of work. At present, however, most of the corundum used in the United States, which is by far the leading consumer, is in the form of very fine powder or flour for use in the grinding and polishing of high precision lenses for naval and military optical instruments. The coarse corundum grain is used mainly in the manufacture of wheels for snagging the forgings and castings for tanks and other military equipment.

"Canadian concentrates should have a corundum content of at least 65 per cent, and preferably 70 per cent, or higher, and they should be as free as possible of magnetic material. South African corundum is marketed in the United States in accordance with Government (Transvaal) grading regulations, based on the alumina content and on screen-sized limits.

"The aforementioned "crystal" corundum of the Transvaal is produced at a much lower cost than it would be possible to produce corundum from any of the deposits on the North American continent. Apparently, however, supplies of this "crystal" corundum are becoming exhausted, or the widely scattered deposits are difficult to operate on an efficient basis. In any event, nearly 30 per cent of the total output of corundum from South Africa in 1944 was in the form of concentrate obtained from the treatment of reef corundum, or plumasite, whereas "crystal" corundum accounted for only 40 per cent of the output as compared with more than 90 per cent in 1940. If this is indicative of an eventual changeover to the production of

concentrate the prospects for the successful development of Canadian deposits will be enhanced. In the post war years, however, natural corundum will again be in competition with artificial abrasives, the civilian uses of which are now restricted. Canadian output of corundum in 1944 totalled 173 tons valued at \$17,830; this came entirely from Renfrew county, Ontario." (Bureau of Mines, Ottawa.)

Diamonds.—Diamonds are not produced in Canada and requirements for stones in the Dominion are supplied entirely by imports. In 1944 imports of black diamonds and bort for borers were appraised at \$1,721,416 compared with \$1,631,019 in 1943. Imports of unset white diamonds in 1944 were valued at \$2,073,098 as against \$1,407,044 in the preceding year.

The following information is from a review on Diamonds in 1944 as published (April 1945) by the Mining Journal, London:

"It is too early as yet to form any useful opinion as to the extent of world production of diamonds, but it is already sufficiently manifest that the downward trend from 1940 to 1943 was halted last year, and perhaps substantially reversed, consequent on the request of the United Nations to the Belgian Congo to double its output of crushing bort, and the reported shipments of over 10,000,000 carats last year. Although this will depend chiefly on the output of the big African producers, one feature of 1944 was the reports of larger production from other sources. For the first time the U.S.S.R. was reported to be in production, Tanganyika was found to be producing on a larger scale, whilst new deposits were reported from Goiaz and Mato Grosso in Brazil. The Japanese, too, are probably exploiting the small deposits in North Borneo to their fullest extent. . . . The tremendous increase in the use of the diamond for industrial purposes has received a very great impetus because of the war, but, as its unequalled advantages have been so widely appreciated in engineering of many kinds, it is unlikely that there will ever be a return to the position where the diamond is predominantly used for gem purposes only. Industrial diamonds have continued to be made available to the United Nations at a very low level by Diamond Corporation, the cheapest crushing bort actually being reduced to 2s 6d. a carat; at first sights in 1945 held in Kimberley, according to the Diamond News, prices were advanced by 5 per cent in some classes, and by 10 per cent in others.

Table 298.—World Production and Sales of Diamonds, 1937-1944

Year	Production	Sales	
	Metric carats	£ Sterling	
1937.....	9,614,024	9,151,205	
1938.....	11,619,971	3,673,934	
1939.....	12,485,318	5,865,000	
1940.....	14,289,525	6,144,814	
1941.....	9,088,014	7,414,420	Industrials.....2,000,000 Cuttables.....5,550,000
1942.....	9,258,734	10,694,671	Industrials.....4,240,000 Cuttables.....6,250,000
1943.....	8,140,000	20,500,000	Industrials.....5,000,000 Cuttables.....15,500,000
1944.....	15,000,000	17,000,000 (estimate)	

Diatomite.—Production of diatomite in Canada has been insignificant and almost all the requirements are imported. Although deposits are numerous and widespread, they are, with few exceptions, small and the material is not suitable as a filter-aid, until recently the principal use. Owing, however, to the use of diatomite as a fertilizer dusting agent, a recent development, Canadian consumption in 1944 was more than double that of 1943, and tests are under way to determine the suitability of Canadian material for this new use.

"Diatomite consists of the microscopically small remains of siliceous shells of diatoms, a form of algae that at one time lived under water. The material of recent (geologically) fresh water origin, which is the most common in Canada, usually occurs as a grey or brown mud or peat, whereas the diatomite of Tertiary age is in dry and compact beds, and is very light in weight and whiff to cream in colour.

"There are more than 400 known deposits of diatomite in Canada. These deposits are in the swamps and in the lake bottoms of northern Nova Scotia; in southern New Brunswick; in the Muskoka district, Ontario; and in various localities in British Columbia. The Tertiary fresh water deposits near Quesnel in the Cariboo district, British Columbia, are by far the largest known in Canada. They extend for many miles along the Fraser River, are compact, and up to 40 feet thick. At Digby Neck, Nova Scotia, is the largest known recent fresh water (swamp) deposit in Canada. All of the Canadian production of diatomite since 1939 has come from these and from the Fraser River localities, the two producers being G. Wightman, who operates the deposit at Digby Neck, and L. T. Fairey, of Vancouver, who has been obtaining his output from Lot 1122, on the west bank of the Fraser River, north of Quesnel. There has been no activity of consequence on the deposits in the Muskoka area for some time.

"Production in 1944 was 39 tons; and sales 13 tons valued at \$437, compared with sales of 98 tons valued at \$3,331 in 1943. Imports into Canada were 11,664 tons valued at \$335,939, of which 73 per cent came from California, 23 per cent from Washington, and 4 per cent from Oregon. In 1943, imports were 5,623 tons valued at \$184,012. Consumption in Canada was approximately 11,680 tons compared with about 5,700 tons in 1943.

"Prior to the war diatomite was produced in about 30 countries, and at present the United States, with about 20 operators, is by far the largest producer, having increased its output in 1944 to nearly 160,000 tons.

"Until recently between 70 and 80 per cent of the diatomite consumed in Canada was used in the form of filter-aids, mainly in the refining of cane sugar, but in 1944 only about 38 per cent was so used, and over 54 per cent was consumed as a dusting agent in ammonium nitrate fertilizers that are made for the Government by three companies, one in Welland, Ontario, one in Calgary, Alberta, and the other in Trail, British Columbia. The diatomite thus used is highly porous and when added to the nitrate it absorbs moisture which prevents it from caking and ensures even spreading. Specifications call for uncalcined material of 325 mesh and less than 5 per cent moisture. The remainder of the diatomite consumed was used chiefly for insulation and as a filler in the paint, chemical, paper, rubber, soap, and textile industries, and in silver polish bases.

"Amongst war uses are: for blocks and pipe insulation in combination with asbestos in the naval construction program; in fireproof structural sheets for minimizing fire hazards on warships; in pressure filters for the filtration of potable water; and in paints for army equipment.

"Indications are that not more than 25 per cent of the calcined material produced from the best-quality Canadian deposit so far discovered can be made into an efficient filter-aid that can compete with the imported product. Thus, the future for Canadian production appears to depend upon whether the tests being made by the British Columbia Department of Mines will prove that the diatomite in the vicinity of Quesnel can be used as a dusting agent in ammonium nitrate fertilizer. Consumption for this purpose in 1944 was 6,315 tons, and all of the requirements are at present being imported from a deposit near Kittitas, Washington. Production of this fertilizer for use in Europe is expected to increase. No other known deposit in Canada contains the type of diatomite that would meet the specification calling for uncalcined material.

"The price of diatomite used in Canada for insulation varies from \$25 to \$40 per ton, for filtration from \$26 to \$75 per ton; for fertilizer grades, \$28 to \$42 per ton; for material suitable for polishes the price for small lots ranged up to \$200 a ton. Imported insulation bricks vary in price from \$85 to \$140 per 1,000, according to grade and density." (Bureau of Mines, Ottawa.)

Table 299.—Production of Diatomite in Canada, 1928-1944

Year	Short tons	\$	Year	Short tons	\$
1928.....	368	8,960	1937.....	643	18,606
1929.....	429	10,330	1938.....	398	13,842
1930.....	554	13,247	1939.....	301	10,388
1931.....	1,610	32,789	1940.....	248	7,957
1932.....	1,496	29,509	1941.....	344	9,935
1933.....	1,789	36,648	1942.....	365	9,088
1934.....	1,372	54,910	1943.....	98	3,331
1935.....	823	33,140	1944.....	13	437
1936.....	615	13,650			

Table 300.—Consumption of Infusorial Earth by the Canadian Sugar Refining Industry, 1932-1944

Year	Pounds	Value	Year	Pounds	Value
		\$			\$
1932.....	2,577,585	73,309	1939.....	4,819,811	105,711
1933.....	2,507,469	70,191	1940.....	4,984,362	112,369
1934.....	2,562,552	69,116	1941.....	5,343,131	138,973
1935.....	4,307,142	96,560	1942.....	3,007,180	75,295
1936.....	4,375,999	98,954	1943.....	3,451,142	89,075
1937.....	4,586,786	95,532	1944.....	4,375,201	115,053
1938.....	4,908,597	101,473			

“**Fluorspar.**—Commercial deposits of fluorspar in Canada occur only in a few areas, and 55 per cent of the total output of 96,000 tons to the end of 1944 was obtained from the Madoc area, Hastings county, Ontario, and 44 per cent from British Columbia. In general, mining of fluorspar has been intermittent and on a small scale, with periods of greater activity during the first world war and the present war. At no time, however, has production been sufficient to meet domestic requirements, and Canada depends largely upon imports to meet the needs of industry. Indicating Canada's dependence on foreign sources of supply, in the 5-year period 1940-1944 reported consumption of fluorspar, largely for military purposes, totalled 227,484 tons. Of this, only 34,296 tons (13 per cent) was derived from domestic mines, 219,171 tons (87 per cent) being imported. In 1944, about 85 per cent of the tonnage imported was obtained from Newfoundland, 14 per cent came from the United States, and the remainder from Mexico.

“To assist in meeting war shortages, the Dominion Government in 1942 initiated a program of assistance to fluorspar producers by means of loans (under arrangements involving the advisory supervision of operations), diamond drilling, geological examination of properties, and in other ways. Of the total output, amounting to almost 25,000 tons in the three years ended 1944, nearly 72 per cent was produced by four operators who were assisted under this program. Most of the mine shipments have comprised material considerably below standard metallurgical specifications and have consisted of screened fines sweetened with clean, picked lump. Average grade of such combined product has ranged from 60 to 65 per cent CaF_2 , calcite and barite being the chief impurities. A number of milling tests were run in the laboratories of the Bureau of Mines, Ottawa, in 1944 on trial shipments from various properties in an effort to reduce the objectionably high barite content of most Canadian fluorspar ores.

“Most of the domestic supply of fluorspar during the present war has come from the Madoc area, Ontario, where the mineral has been mined intermittently for about 40 years. Since 1939, most of the output has come from the Noyes, Perry, Keene, Wallbridge, Blakeley, Rogers, and Bailey mines. The Rogers mine, last actively operated in 1914, was reopened late in 1943, when operations at the Perry mine were abandoned. On the Bailey property a new vein was opened up in August, 1944, following the cessation of operations at the Keene mine.

“The fluorspar bodies in the Madoc area consist of a series of impersistent shallow veins that fill fractures in limestone, and the vein zone extends for several miles adjacent to a major

fault. At a few mines the veins extend downward into underlying granite. Much of the ore consists of an interbanded association of fluorspar, calcite, and barite, which presents serious concentrating difficulties.

"Some interest has been shown in recent years in fluorspar occurrences in the Wilberforce-Harcourt district, Haliburton county, about 50 miles north of Madoc, where diamond drilling and some surface work were done on several properties in 1943. The ore is an intimate mixture of fluorspar and calcite. It usually also contains considerable apatite, and some mica and other silicate minerals. The work did not disclose any important ore-bodies, and there was little further activity in 1944. W. E. Clark (Tops Mining Syndicate) produced a few tons of high-grade picked spar from his holdings near Harcourt.

"In the latter part of 1944 a deposit of fluorspar, essentially similar in character to that of the Haliburton area, was discovered near Cobden, in Renfrew county. The property is owned by Eric Johnston, of Cobden. Some surface work was done by Dominion Magnesium, Limited to determine whether the deposit might supply the fluorspar requirements of the company's magnesium plant at nearby Haley, but no report on the results is available.

"Scattered occurrences of fluorspar are known in Quebec, but a few of these appear to be of economic importance. In 1943 and 1944, some work was done by Twin Valley Prospecting Syndicate, of Ottawa, on fluorspar showing near Sand Creek, north of Otter Lake, Pontiac county. About 20 tons of clean, picked spar was shipped in 1944 to the plant of Dominion Magnesium, Haley, Ontario. Grade is reported to have run 92 to 98 per cent CaF_2 . This represents the first recorded production of fluorspar in the province.

"In Nova Scotia, there is considerable fluorspar in some of the barite veins near Trout River, Inverness county, where work was done in 1942 and 1943 on the MacKay property. In 1944 the Provincial Department of Mines continued a program of diamond drilling and geological investigation on the property, which was also examined and sampled by Canadian Industrial Minerals, Limited. A shipment of the ore was sent to the Bureau of Mines, Ottawa, to determine whether recovery can be made of fluorspar and barite products.

"In British Columbia, Consolidated Mining and Smelting Company operated a large deposit of fluorspar between 1919 and 1929 at its Rock Candy mine, near Grand Forks, and produced about 70,000 tons of ore, from which 42,000 tons of concentrate was recovered. The mine has since been idle and there has been no further production of fluorspar in the province. In the latter part of 1942, interest developed in a fluorspar occurrence near Birch Island, North Thomson River, where drilling operations have been undertaken by Globe Investment Company, 11 King Street West, Toronto. The deposit consists of a fine-grained, intimate mixture of fluorspar, celestite, and feldspar, with considerable pyrite. Preliminary results of tests on trial shipments by the Bureau of Mines, Ottawa, indicate that the ore is amenable to flotation.

"Canada produced 6,924 tons of fluorspar valued at \$217,701 in 1944, compared with 11,210 tons valued at \$318,424 in 1943.

"Imports were 37,101 tons valued at \$840,309, compared with 77,436 tons valued at \$1,738,669 in 1943. Most of the material came from Newfoundland, and was consigned to Arvida, Quebec, for use in the production of aluminium.

"In 1944, the six following producers, all in the Madoc area reported shipments: Reliance Fluorspar Mining Syndicate (Rogers mine); Millwood Fluorspar Mines (Keene and Bailey mines); Charles Stoklosar (Blakeley mine); Bassett Fluorspar Mining Syndicate (Lee Junior mine); Detomac Mines (McIlroy mine); and Fluoroc Mines (Howard mine). Nearly 60 per cent of the total output from the above seven mines came from the Rogers property, 14 per cent from the Bailey, 10 per cent from the Keene, and 9 per cent from the Blakeley. The Reliance, Millwood, and Fluoroc were Government-assisted projects.

"Production of fluorspar from the Madoc area during the five years 1940 to 1944, inclusive, amounted to about 32,000 tons, or 94 per cent of the total domestic output.

"World production of fluorspar prior to the war averaged about 500,000 short tons annually, of which the United States and Germany supplied about 75 per cent. The remainder came mainly from Russia, the United Kingdom, Newfoundland, France, Korea, Italy, and the Union of South Africa.

"The United Kingdom is the leading Empire source of fluorspar. Newfoundland, which is next on the list, has large reserves and has greatly expanded shipments in recent years.

"Consumption of fluorspar in Canada in 1944 was 56,900 tons, of which 60 per cent was used by non-ferrous smelters including aluminium and magnesium plants; 33 per cent by the steel trade; and 5 per cent by the heavy chemicals industry.

"Fluorspar has a variety of industrial uses, in most of which it serves as a powerful fluxing agent. The steel industry is by far the largest consumer. In basic open-hearth and electric furnace charges, fluorspar is an essential ingredient, imparting fluidity to the slag and permitting the use of larger quantities of lime, the agent most effective in removing sulphur, phosphorus, and other impurities. About 6 pounds of spar is required per ton of steel made in the open-hearth, and 20 pounds per ton for that made in the electric furnace. Fluorspar is used in small amounts in numerous other metallurgical industries, including foundries and various metal-refining operations. A small addition of fluorspar is made to the ferrosilicon-calcined dolomite briquettes used in the production of magnesium by the Pidgeon process, where it serves as a catalyst and improves recovery.

"The next largest use for the mineral is in the manufacture of hydrofluoric acid, which is used mainly in making artificial cryolite and aluminium fluoride for the aluminium industry. The anhydrous acid is used in making organic ("Freon") refrigerants, a recently expanded use for which as an aerosol insecticide carrier in the newly developed "mosquito bombs" is of timely interest in view of the highly effective use that is being made of these "bombs" against malarial mosquitoes in the Pacific war theatre. The acid is being used to an increasing extent as an improved catalyst, in place of sulphuric acid, for the alkylation of olefins in the production of 100-octane aviation gasoline. Next in importance is the use of fluorspar as a fluxing and opacifying ingredient in glass and enamels.

"Standard fluxing gravel or lump grade for metallurgical use is usually sold on a specification of a minimum 85 per cent CaF_2 , and not over 5 per cent silica or 0.3 per cent sulphur. It should not contain more than 15 per cent of fines. Owing to recent shortages, however, sales in the United States are being made on the basis of 78 per cent CaF_2 , with a minimum of 55 'effective units', and up to 1 per cent sulphur. Effective units are computed as being CaF_2 percentage less $2\frac{1}{2}$ times the silica content. Canadian shipments have been running much below even this reduced standard, and in some cases consumers sweeten the material with higher grade imported spar.

"Glass and enamel grades call for not less than 95 per cent CaF_2 , with a maximum of $2\frac{1}{2}$ to 3 per cent SiO_2 and 0.12 per cent Fe_2O_3 . The material must be in ground form, in mesh sizes ranging from coarse to extra fine.

"Acid-grade spar has the most rigid specification, namely a minimum of 98 per cent CaF_2 and not over 1 per cent SiO_2 . Like the ceramic grade, it must be in powder form, and most of the material supplied to the acid and ceramic trades is a flotation concentrate.

"By arrangement with consumers, the price of domestic metallurgical fluorspar was set in 1942 by the Metals Controller on the following basis: \$24 in U.S. funds a short ton, f.o.b. Kentucky-Illinois mines, plus 11 per cent exchange, plus 10 per cent war exchange tax, plus freight from above field to Canadian consuming point, less freight from Canadian mine to same point, less 25 cents for each per cent CaF_2 below 85 per cent. As an example, this would work out at \$36.36 a short ton for standard 85 per cent grade, f.o.b. Madoc, for shipment to Sault Ste. Marie, Ontario, or \$32.38 for shipment to Hamilton, Ontario. Although maximum prices in the Illinois-Kentucky field were revised in July, 1943, there was no change in the above arrangement in 1944 as a result of the increases.

"In 1942, fluorspar was placed on the list of minerals requiring a permit for exportation from Canada, but this restriction was withdrawn, effective April 1, 1944, in respect to shipments to the United States and to any part of the British Empire.

"The duty on metallurgical grade fluorspar entering the United States is \$5.625 a ton, and on acid and ceramic grades, \$3.75 a ton. There is no duty on fluorspar imported into Canada." (Bureau of Mines, Ottawa.)

Table 301.—Production of Fluorspar in Canada, 1924-1944

Year	Short tons	\$	Year	Short tons	\$
1924.....	76	1,343	1936.....	75	900
1925.....	3,886	19,234	1937.....	150	2,550
1926-1928.....			1938.....	217	3,906
1929.....	17,870	268,120	1939.....	240	4,995
1930.....	80	1,240	1940.....	4,454	59,317
1931.....	40	620	1941.....	5,534	97,767
1932.....	32	464	1942.....	6,199	146,039
1933.....	75	1,064	1943.....	11,210	318,424
1934.....	150	2,100	1944.....	6,924	217,701
1935.....	75	900			

Table 302.—Consumption of Fluorspar in Canada, by Uses, as Reported to the Annual Census of Industry, 1943 and 1944

Industry	1943		1944	
	Quantity	Cost at works	Quantity	Cost at works
	tons	\$	tons	\$
Steel furnaces.....	20,790	715,991	20,024	692,104
Chemicals (acids, alkalis and salts).....	41,409	1,320,106	35,477	1,019,624
Glass.....	273	13,360	376	20,776
Ferro-alloys.....	1,407	37,802	104	3,514
Enamelling and glazing.....	74	2,960	116	4,640
Total accounted for.....	63,953	2,090,219	56,097	1,740,658

Table 303.—Imports of Fluorspar Into Canada, 1929-1944

Year	Tons	\$	Year	Tons	\$
1929.....	12,092	159,798	1937.....	11,444	158,082
1930.....	12,651	160,995	1938.....	15,057	212,131
1931.....	3,216	31,257	1939.....	16,322	258,796
1932.....	1,009	22,965	1940.....	30,312	628,719
1933.....	2,219	21,165	1941.....	26,539	567,656
1934.....	7,220	56,628	1942.....	47,784	1,046,526
1935.....	11,591	92,775	1943.....	77,436	1,738,669
1936.....	11,194	95,268	1944.....	37,100	840,309

Table 304.—Fluorspar Mining in Canada, 1943 and 1944(*)

	1943	1944
Active firms.....No.	10	10
Employees—On salary.....No.	12	11
Wage-earners.....No.	85	67
Total.....No.	97	78
Salaries and wages—Salaries.....\$	17,084	17,237
Wages.....\$	113,201	85,094
Total.....\$	130,285	102,331
Gross value of production.....\$	318,424	217,701
Cost of fuel and electricity.....\$	20,145	14,869
Process supplies used.....\$	13,370	10,148
Net value of production.....\$	284,909	192,684

(*) Data included in Tables 331 to 334.

"Garnet.—Niagara Garnet Company shipped about 100 tons of garnet rock to a small mill at Sturgeon Falls, Ontario, from a deposit in Dana township, concession III, lots 1 and 2, 4 miles north of River Valley Station (41 miles northwest of North Bay). About 10 tons of ore from this rock was treated, and 3 tons of concentrate valued at \$90 was shipped to the company's head office in Niagara Falls, New York, for further treatment.

"Canada Garnet, Limited mined a few tons at its property south of Labelle, 100 miles north of Montreal, and shipped a car lot to the Quebec Bureau of Mines' treatment plant at Val d'Or, where 2 tons of concentrate was made. Samples were sent to foundries for sand-blasting tests. Tests were made by the Bureau of Mines, Ottawa, on concentrate submitted by the company to determine the efficiency of the garnet for sandblasting on metal and stone, compared with that of silica sand and artificial abrasives in general use. Results did not indicate any advantage in its use.

"A. G. Chew, of Sudbury, prospected a garnet zone in Loughrin township, concession IV, lot 14, about 24 miles east of Sudbury, and shipped 4 tons of ore to the United States for experimental purposes.

"About 85 per cent of the world output of garnet comes from the United States, mainly from North Creek, New York, and the product is regarded as the world standard abrasive garnet. Production in 1944 dropped over 20 per cent below the 1943 output of 5,935 tons, valued at \$429,120.

"Garnet, crushed and suitably graded as to size, is used for making abrasive-coated papers and cloth, which in turn are used mainly in the wood-working (hard woods) and to a lesser extent in the shoe leather industries. The specifications for garnet for this use are somewhat exacting. Few, if any, of the hundred or more garnet deposits so far examined in Canada fulfil all of the requirements. Minor uses for garnet are for sandblasting; for surfacing plate glass, and garnet superfine (flour) grades are now being used as a partial substitute for corundum flour used for optical lens polishing.

"Canadian consumption of garnet grain suitable for "sandpaper" manufacture is less than 200 tons annually and none is at present commercially used for sandblasting. Competition from the artificial abrasives (silicon carbide and oxide of alumina) is a serious factor in the marketing of garnet.

"Prices of ungraded concentrate suitable for sandpaper range from \$60 to \$85 a ton." (Bureau of Mines, Ottawa.)

"Graphite.—Production of graphite in Canada in 1944 continued to be confined to the old-established Black Donald mine near Calabogie, in Renfrew county, Ontario, which produces a variety of grades of mill products for different industrial uses.

"There were no important changes in the general graphite situation in 1944. Supply for Allied Nations' requirements maintained the over-all improvement shown in the previous year, and the concern felt in the earlier stages of the war over possible shortages, particularly of crucible grades, was much less in evidence.

"Flake graphite is widely distributed in many parts of the Canadian Precambrian Shield, chiefly in gneisses and crystalline limestones. Production has been confined to adjacent sections of western Quebec and eastern Ontario, in the general Ottawa region. Occurrences of flake graphite are known also in Manitoba and British Columbia, but so far these have attracted little interest. Bodies of amorphous graphite occur near Saint John, New Brunswick, and were worked on a small scale many years ago.

"In 1942, Frobisher Exploration Company (a subsidiary of Ventures, Limited) undertook a geological investigation of the Black Donald property and conducted a diamond-drilling program, as a result of which a substantial tonnage of new ore was located. Frobisher Exploration took over the property in 1943, and has since been operating it under the name

of Black Donald Graphite, Limited. A new power plant on the Madawaska River was completed at the end of 1943 to replace the old one washed out earlier in the year, and various additions and changes were made in the mill circuit.

"Canadian production of graphite in the form of finished mill products totalled 1,582 tons valued at \$171,166, with sales valued at about \$125,000. Output consisted mainly of foundry grades, but included also some 300 tons of high-grade lubricating flake. In 1943, production was 1,903 tons valued at \$197,431.

"Exports of milled and finished concentrates were 576 tons valued at \$87,774, compared with 611 tons valued at \$80,961 in 1943. Most of the material went to the United States.

"Imports of unmanufactured graphite, most of which was Mexican amorphous, were valued at \$48,095; of manufactured, at \$261,205; and of graphite crucibles, at \$128,738. These values compare with \$23,773, \$286,583, and \$191,296, respectively, in 1943.

"Artificial graphite is made in Canada by Electro-Metallurgical Company of Canada, Welland, Ontario, and by Exolon Company, Thorold, Ontario. These companies export part of their production to the United States.

"Prior to the war, world production of natural graphite of all types, and including flake, crystalline (plumbago), and amorphous, averaged about 140,000 short tons a year. Madagascar, Germany, Austria, and Czechoslovakia were the principal sources of flake; Ceylon, of plumbago; and Mexico and Korea, of amorphous.

"The United States and Canada possess important graphite reserves, but are deficient in the types of graphite required for the most exacting uses, notably for crucible manufacture. Deposits are comparatively low grade for the most part, and production costs are high. Consequently, the United States depends, for most of its requirements of high-grade graphite, on imports of flake from Madagascar and of plumbago from Ceylon. Production of all types and grades in the United States in 1943 totalled just under 10,000 tons.

"In 1943, shipments of graphite from Ceylon amounted to 20,501 tons, a decline of 25 per cent from the 1942 figure. For the past several years all graphite from Ceylon and Madagascar has been purchased by the British Ministry of Supply, under allocation agreement with the United States Government for Allied Nations' use.

"Graphite has many uses in industry, but is employed principally in foundry facings, lubricants, crucibles, retorts and stoppers, packings, pencils and crayons, paints, and stove polish. Important quantities, mostly amorphous or artificial, are used in dry batteries, electrodes, and commutator brushes.

"The flake of the Black Donald deposit is too small for crucible use, but the products made are high in carbon and are well suited for lubricants, packings, polishes, and foundry requirements, for which purposes most of the output is sold. Prepared facings for the domestic foundry trade also are made.

"Canadian graphite requirements are principally for the foundry, dry battery, packings, lubricants and paint trades. Foundry needs are met in part by domestic (Black Donald) production, and in part by plumbago from Ceylon. The battery trade uses mainly Mexican amorphous; and paint requirements are filled largely by low-grade amorphous and flake. American imports of Canadian graphite are used in foundry facings, lubricants, and pencils.

"In general, a No. 1 crucible flake should be coarser than 50-mesh, with about 40 per cent standing on a 35-mesh screen and 40 per cent on a 28-mesh screen. Carbon content should be 85 per cent, or over.

"Trade quotations showed little change in 1944 from those of the previous year. All Ceylon and Madagascar graphite continued to be purchased and sold to consumers at fixed prices by Metals Reserve Company, which also had set prices on United States flake.

"The duty on graphite entering the United States under the general tariff is 5 per cent ad valorem on natural amorphous and artificial grades, and 15 per cent on crystalline lump, chip, and dust grades. The Canadian tariff is as follows: graphite, not ground or otherwise manufactured, British, free; intermediate (including the United States), $7\frac{1}{2}$ per cent ad valorem; general, 10 per cent; on ground and manufactures of, including foundry facings, but not crucibles, British, 15 per cent; intermediate, $22\frac{1}{2}$ per cent; general, 25 per cent.

"Exports of Canadian graphite and graphite products have been subject to special export licence since January, 1941." (Bureau of Mines, Ottawa)

Table 305.—Mine Production (Sales) of Graphite in Canada, 1931-1944

Year	Short tons	\$	Year	Short tons	\$
1931.....	548	32,149	1938.....	(*)	41,590
1932.....	346	18,483	1939.....	(*)	61,684
1933.....	405	18,367	1940.....	(*)	94,038
1934.....	1,518	71,424	1941.....	(*)	132,924
1935.....	1,782	79,781	1942.....	1,192	117,904
1936.....	(*)	88,812	1943.....	1,903	197,431
1937.....	(*)	125,343	1944.....	1,582	179,457

(*) Not available for publication.

Table 306.—Consumption of Graphite or Plumbago in Canada, by Industries, as Reported to the Census of Industry, 1943 and 1944

Industry	1943		1944	
	Quantity	Cost at works	Quantity	Cost at works
	Short tons	\$	Short tons	\$
Paints and varnishes.....	94	9,837	75	9,198
Polishes.....	57	6,525	51	6,635
Foundries.....	606	72,150	793	96,280
Acids and salts.....	167	45,654	147	48,194
Prepared foundry facings.....	202	19,789	278	20,734
Total accounted for.....	1,126	153,955	1,344	181,041

"**Grindstones, Pulpstones, and Scythestones.**—Material suitable for these stones occurs in certain sandstone beds in Nova Scotia, New Brunswick, and on the coast of British Columbia. Many years ago the output was considerable, but most of the known beds have been depleted and the demand for natural stones has decreased.

"No pulpstones or scythestones were produced in 1944, but 225 tons of grindstones valued at \$12,000 were shipped by the Read Stone Company, Sackville, from quarries near Stonehaven on the Bay of Chaleur, northern New Brunswick. In 1943 that company produced about 162 tons of grindstones and 2 tons of scythestones having a total value of \$6,225.

"Pulpstones were last produced in 1937 by the J. A. and C. H. McDonald Company from Gabriola Island, near Nanaimo on Vancouver Island, British Columbia. Good pulpstones are in demand, particularly for use in the large magazine grinders, but known Canadian deposits containing thick beds of sandstone of the proper quality appear to have been worked out and production has ceased. There is also an increasing competition from Canadian-made artificial segmental pulpstones, mainly of silicon carbide grit, and about 650 of these stones are in use and in stock in the various Canadian pulp mills. The imported natural pulpstones come mainly from West Virginia." (Bureau of Mines, Ottawa.)

The following were imported into Canada during 1944: grinding wheels \$389,818; grinding stones \$69,682; 578 grindstones, 36 inches or over \$59,211 and 672 grindstones, n.o.p. \$2,098.

Table 307.—Production of Grindstones, Pulpstones and Scythestones in Canada, 1931-1944

Year	Tons	\$	Year	Tons	\$
1931.....	621	38,103	1938.....	306	16,198
1932.....	328	15,735	1939.....	304	15,278
1933.....	498	21,919	1940.....	341	14,543
1934.....	987	46,478	1941.....	388	11,500
1935.....	708	34,010	1942.....	216	10,000
1936.....	569	24,724	1943.....	164	6,225
1937.....	412	21,429	1944.....	225	12,000

Table 308.—Production of Natural Abrasive Stones, by Kinds, 1943 and 1944

	Pulpstones		Sharpening Stones		Grindstones	
	Tons	\$	Tons	\$	Tons	\$
1943						
Nova Scotia.....						
New Brunswick.....			2	225	162	6,000
Canada.....			2	225	162	6,000
1944						
Nova Scotia.....						
New Brunswick.....					225	12,000
Canada.....					225	12,000

Table 309.—Consumption of Pulpstones by the Canadian Pulp and Paper Industry, 1931-1944

Year	Number for 2 ft. wood	Value	Number for 2.5 ft. wood	Value	Number for 4 ft. wood	Value
		\$		\$		\$
1931.....	226	72,588	225	71,760	285	337,580
1932.....	210	65,450	139	46,436	222	249,373
1933.....	321	98,475	95	31,945	199	223,635
1934.....	378	103,811	84	29,680	268	292,359
1935.....	417	116,501	52	20,297	237	243,805
1936.....	463	120,227	61	19,478	253	281,265
1937.....	392	123,598	84	21,700	280	382,084
1938.....	306	92,822	37	13,351	186	238,488
1939.....	242	60,622	60	22,443	203	238,620
1940.....	311	96,957	110	49,899	163	257,628
1941.....	295	127,349	77	35,843	97	215,913
1942.....	237	100,466	53	23,898	94	208,986
1943.....	197	102,888	54	20,000	66	151,411
1944.....	187	89,133	57	34,865	76	193,396

Kyanite.—Kyanite is usually a rock-forming mineral, and only rarely does it occur in large mono-mineralic masses as segregations in quartz-kyanite gneiss or schist. The mineral occurs in Nyasaland, British East Africa and Western Australia.

Consumption of the sillimanite-group minerals increased in the United States in 1941. Shipments of United States kyanite by five firms rose to 8,335 short tons valued at \$175,581; imports of British India kyanite also increased in 1941, receipts during the first nine months amounting to 6,211 short tons, having a foreign market value of \$81,356. The metallurgical industries account for about 50 per cent of the total kyanite refractories used in the United States.

The leading andalusite mine in the world is operated by Champion Sillimanite, Inc., in the White Mountains, California; this company is a subsidiary of the Champion Spark Plug Co., Detroit, Mich.

None of the minerals, kyanite, sillimanite or andalusite are commercially mined in Canada at the present time and any imports of these minerals into Canada are not shown separately in the Canadian customs classification. "Metal and Mineral Markets", New York, September, 1945, quoted kyanite, per ton f.o.b. point of shipment, crude, \$19; 35 mesh, \$37.50; glass grade \$40 nominal.

Table 310.—Materials Used in Manufacturing, 1943 and 1944

Material	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
Bauxite and pure alumina.....	ton	227,662	\$ 5,902,898	194,348	\$ 4,992,034
Coal (not for fuel)—					
For fused alumina.....	ton	245	1,614	308	2,247
For silicon carbide.....	ton	8,019	60,343	5,303	41,771
Coke (not for fuel)—					
For fused alumina:					
Petroleum coke.....	ton	2,303	17,631	2,054	13,785
Other coke.....	ton	12,140	71,914	2,707	15,445
For silicon carbide:					
Petroleum coke.....	ton	37,008	606,044	34,722	514,057
Other coke.....	ton	21,138	298,513	14,738	208,236
For other uses:					
Other coke.....	ton			2,395	30,460
Electrodes.....	ton	4,279	520,286	3,318	403,660
Feldspar.....	ton	117	5,776	75	2,260
Iron borings.....	ton	20,889	283,311	19,991	269,409
Salt.....	ton	410	4,793	343	3,858
Sawdust.....	ton	12,766	44,223	12,706	44,836
Silica sand.....	ton	89,022	511,649	73,771	428,317
Artificial abrasive grains—					
For re-treatment only:					
Fused alumina.....	ton	7,296	224,056	6,286	198,381
Silicon carbide.....	ton	209	6,442	207	12,600
For wheels, paper, etc.—					
Fused alumina.....	ton	4,106	826,967	3,300	660,168
Silicon carbide.....	ton	1,543	298,675	1,069	250,132
Natural abrasive grains—					
Garnet.....	lb.	343,929	29,768	393,572	34,546
Emery.....	lb.	308,548	19,982	312,458	17,904
Quartz or flint.....	lb.	349,340	5,410	536,373	8,046
Other.....	lb.	76,545	5,608	65,357	6,535
Bonding and bushing materials—					
Clay bonds.....	lb.	1,152,171	55,907	986,308	41,919
Silicate (quantity in equivalent solid form).....	lb.		2,799	7,793	934
Elastic mixture.....	lb.	12,291	3,221	11,047	3,095
Bakelite and synthetic resins.....	lb.	365,704	123,057	285,491	80,768
Lead for bushings.....	lb.	107,341	5,978	103,567	5,647
Cotton cloth.....			340,709		317,201
Kraft paper.....			21,425		15,717
Containers and packing material.....			114,823		84,692
All other materials.....			1,168,151		1,217,583
Total			11,581,923		9,926,243

Table 311.—Products Manufactured, 1943 and 1944

Product	1943		1944	
	Short tons	Selling value at works	Short tons	Selling value at works
Crude silicon carbide.....	51,281	\$ 6,846,087	47,100	\$ 5,499,628
Crude fused alumina.....	190,727	20,543,657	166,098	17,768,484
Silicon carbide firesand, etc.....	229	14,336	167	10,135
Abrasive wheels and segments.....		5,114,962		3,321,873
Sharpening stones and files.....		303,913		197,186
Ferrosilicon.....	15,860	240,430	14,585	223,473
Other products (*).....		3,546,543		3,044,334
Total		36,609,928		30,065,113

(*) Includes abrasive cloth, abrasive paper, tiles, artificial pulpstones, artificial graphite, boron carbide, boron carbide shapes, calcium boride, fused magnesia, refractory cements, firebrick, etc., each of which was reported by one or two companies.

“Lithium Minerals.—Amblygonite, spodumene, and lepidolite are the chief lithium minerals of commerce: their ores contain, respectively, about 8, 6 and 4 per cent of lithium oxide. Spodumene is in greatest supply, and is the base raw material for the manufacture of many lithium salts, lithium metal, and alloys. Amblygonite has similar uses, but is scarcer and more expensive. Lepidolite, or lithia mica, is employed mainly in the natural state as a batch ingredient in glass. The occurrence of all three minerals is confined to pegmatite dykes of a definite type, which usually have a localized, regional distribution and often carry, also, important amounts of beryl and tantalite-columbite. In some cases, such dykes have been worked for the recovery of all of these minerals.

“There has been no recorded production of lithium minerals in Canada since 1937, when 32 tons of amblygonite and spodumene valued at about \$1,700 was shipped, and little if any lithium ore is known to be used or required for any purpose in the Dominion. Thus, an outside market would have to be found for any production. Considerable development work has been done in recent years, however, on deposits in the Pointe du Bois area in southeastern Manitoba; and in the three years ended 1944 increased interest was shown in the commercial possibilities of lithium deposits in other sections of that province, though activities have been confined to exploratory drilling. Some attention has been given, also, to lithium-bearing deposits in the Yellowknife-Beaulieu area in the Northwest Territories.

“Lithium ores and compounds early became of strategic importance in the present war, and to conserve supply for defence needs the United States Government placed both under allocation control in 1942. Government assistance also was given to the establishment of two spodumene mills, one in North Carolina, and the other in South Dakota. These measures resulted in a considerable easing of the general supply situation in 1944.

“Total production in Canada during the active period 1925 to 1937, inclusive, is estimated at about 250 tons, and comprised lepidolite, spodumene, and amblygonite. Most of the material was exported to the United States.

“The United States and Southwest Africa have been the two leading producers of lithium ores in recent years, with the former probably supplying well over 50 per cent of the annual total, and possessing the largest reserves. Production consists mainly of spodumene and amblygonite, and in the United States has come chiefly from the Black Hills region in South Dakota. An additional important source of lithia in the United States is lithium-sodium phosphate, recovered from the brine of Searle's Lake, at Trona, California, which at present furnishes nearly 50 per cent of the total American lithia production. Shipments of lithium ores and compounds in the United States in 1944 reached an all-time high of 13,319 tons, a 63 per cent increase over the previous year.

“There are no plants in Canada for the chemical treatment of lithium ores. Most of the world production marketed prior to the war was treated by a few large chemical firms specializing in the business, the principal plants being in the United States, Great Britain, Germany, and France. Such firms usually purchased their requirements under individual contract, and there has thus been little in the way of an open market, price quotations given in trade journals being merely nominal. Some of the larger consumers own and operate their own mines.

“Prices of lithium minerals in 1944 showed little change from those of the previous year. Amblygonite, 8 to 9 per cent Li_2O , was quoted at \$40 to \$50 per ton; spodumene, 6 per cent grade, at \$5 to \$6 per unit for mill concentrates; and lepidolite, 3 per cent Li_2O at \$25 per ton, all f.o.b. mines. Lithium metal was unchanged at \$15 per pound.

“Magnesitic Dolomite and Brucite.—Magnesite is found in Quebec and British Columbia. In Quebec the magnesite occurs intimately associated with dolomite and the rock is properly termed ‘magnesitic dolomite.’ It is quarried at Kilmar and at Harrington East, Argenteuil county, and is processed for use as refractory materials.

“Large deposits of magnesite containing considerable silica and alumina occur in British Columbia near Marysville, between Cranbrook and Kimberley. They are owned by Consolidated Mining and Smelting Company of Canada, Limited, and experimental work to remove the

silica and alumina by flotation has been done, but there has been no commercial production. A number of other deposits of magnesite are known in British Columbia and Yukon, but either because of their limited extent or distance from transportation they are not of commercial importance at present.

"Deposits of earthy hydromagnesite occur in British Columbia near Atlin and Clinton, and at various times some of them have been worked on a small scale, but there has been no production in recent years.

"Brucite (magnesium hydroxide) in the form of granules thickly disseminated through a matrix of crystalline limestone occurs in large deposits at Rutherglen, Ontario, and at Bryson and Wakefield in Quebec. By a process developed in the Bureau of Mines laboratories, Ottawa, these brucite granules are recovered in the form of magnesia of a high degree of purity, and hydrated lime is obtained as a co-product in a plant near Wakefield. The deposits are the largest known in the world.

"In 1944 the value of products made from magnesitic dolomite and brucite was \$1,139,281, compared with \$1,260,056 in 1943.

"Exports of basic refractory materials made from magnesite and brucite in 1944 amounted to 1,013 tons valued at \$31,583, compared with 9,006 tons valued at \$110,976 in 1943.

"Imports of magnesia products in 1944 had a value of \$1,513,902 and consisted of the following items: dead-burned and caustic-calcined magnesite, \$466,314; magnesite brick, \$718,481; magnesia, \$219,116; magnesia pipe covering, \$71,138; and magnesium carbonate, \$38,853. In 1943 the total value of these products was \$1,746,060.

"Products from magnesitic dolomite include dead-burned or grain material, bricks and shapes (burned and unburned), caustic-calcined magnesitic dolomite, and finely ground refractory cements.

"The magnesia obtained from brucitic limestone is in granular condition. The greater part of the production is dead-burned and made into the same types of refractory products as is the magnesitic dolomite, but important quantities are also marketed in the lightly calcined state for use as an ingredient in chemical fertilizers, and also for making paper.

"Products made in Canada from imported magnesite and magnesia include fused magnesia (artificial periclase), optical periclase, and '85 per cent magnesia' pipe covering.

"Prices of calcined magnesite in 1944, f.o.b. Montreal or Toronto, as quoted by Canadian Chemistry and Process Industries, were \$70 to \$90 a ton.

"Magnesite is usually calcined before shipment and the resultant magnesia is used for the making of refractory products to withstand extremely high temperatures, for making oxychloride cement, and for the production of magnesium. It is the basis for a number of magnesium salts and has many minor uses.

"Brucite is much less common than magnesite and the only deposits being worked commercially are in Canada and the United States. The magnesia obtained by calcining brucite can be used for the same purposes as that obtained from magnesite and it also has some special uses.

"Dolomite and sea-water compete with magnesite and brucite as sources of magnesia products. Dolomite, in addition to its use as a refractory material, has long been the principal source of basic magnesium carbonate and pure magnesium oxide, and in recent years it has become a source of magnesium metal.

"Sea-water has become an important source of magnesia in England and the United States for use in making magnesium and for various industrial and pharmaceutical purposes." (Bureau of Mines, Ottawa.)

Table 312.—Production of Magnesitic Dolomite (Calcined) in Canada, 1931-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1931.....	11,411	295,579	1938.....	(a)	(c) 420,261
1932.....	(a)	262,860	1939.....	(a)	474,418
1933.....	(a)	360,128	1940.....	(a)	897,016
1934.....	(a)	382,927	1941.....	(a)	831,041
1935.....	(a)	486,084	1942.....	(a)	(b)1,059,374
1936.....	(a)	768,742	1943.....	(a)	1,260,056
1937.....	(a)	677,207	1944.....	(a)	1,139,281

(a) Not available for publication.

(b) 1942 and following years include the value of brucite shipped.

(c) Represents value of magnesite (dead-burned, etc.) only, whereas the values for years immediately preceding include the value of some end products containing imported material; for this reason the 1938 to 1944 values are not entirely comparable with those for preceding years.

Table 313.—Magnesite and Dolomite Used in the Canadian Primary Iron and Steel Industry, 1931-1944

Year	Calcined Dolomite (b)		Dolomite, crude		Magnesite	
	Short tons	Value	Short tons	Value	Short tons	Value
		\$		\$		\$
1931.....			15,773	76,317	(a)	(a)
1932.....			6,725	32,523	420	14,500
1933.....			6,874	30,557		14,798
1934.....			14,748	69,104	2,733	105,072
1935.....			18,394	79,914	3,891	149,987
1936.....			43,562	145,502	6,432	230,656
1937.....			53,066	181,146	8,994	326,091
1938.....			40,540	137,127	9,219	336,811
1939.....			40,592	78,904	11,401	351,680
1940.....	14,858	99,838	59,284	123,429	13,673	506,032
1941.....	21,949	136,360	71,087	159,037	18,127	682,742
1942.....	21,608	160,602	79,091	225,393	20,665	786,321
1943.....	22,550	179,427	78,746	243,793	19,427	744,716
1944.....	10,310	99,740	77,085	189,774	18,665	740,450
	8,516	125,990				

(a) Information not available.

(b) Included with crude dolomite prior to 1939.

Relatively large quantities of magnesite or magnesium refractories are also used in the smelting of non-ferrous ores but complete data relating to this consumption are not yet available.

Table 314.—Calcined Magnesite Used by the Artificial Abrasives and Abrasive Products Industry in Canada, 1933-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1933.....	(*)	16,430	1939.....	121	7,735
1934.....	104	6,370	1940.....	302	19,331
1935.....	40	2,448	1941.....	809	77,508
1936.....	418	25,256	1942.....	398	58,648
1937.....	484	29,242	1943.....	150	12,164
1938.....			1944.....	771	102,591

(*) Information not available.

"Magnesium Sulphate.—Natural hydrous magnesium sulphate (Epsom Salts or Epsomite) occurs in deposits in lake bottoms or in solution in brine lakes in British Columbia. In Saskatchewan, it is found associated with sodium sulphate. Attempts have been made to produce refined salts, and a number of years ago there was a considerable production from several of the 'lakes' in British Columbia. Experimental shipments have been made also from one of the lakes in Saskatchewan.

"Canada's output of magnesium sulphate has come chiefly from a deposit in Basque, British Columbia, production from which was discontinued in the autumn of 1942. The salt was refined at Ashcroft, 15 miles south of the deposit, and the grade of the product was high. The refinery, now owned by Ashcroft Salts Company, Limited, had a capacity of 10 tons of salt a day. There are a number of other occurrences in British Columbia, near Clinton, north of Kamloops, and in Kruger's Pass, south of Penticton.

"In Saskatchewan two lakes south of Wiseton contain brines high in magnesium sulphate, and Muskiki Lake, just north of Dana, contains brine high in magnesium and sodium sulphates, which at certain times of the year crystallizes into a bedded deposit with layers of both salts.

"There was no production of magnesium sulphate in Canada in 1943 and 1944. In 1942 the production was 1,140 tons valued at \$38,760.

"Imports of magnesium sulphate in 1944 were 2,684 tons valued at \$108,795, compared with 3,379 tons valued at \$137,372 in 1943. The imports were mainly from the United States.

"In the chemical industries, Epsom salt has many uses. It is employed for tanning and in dyeing, and for textile and medicinal use. Magnesium sulphate is used in the paper industry for weighting paper. In the sole leather industry it is used to obtain a clean shiny cut, and it also helps to retain moisture in the leather and increases its weight. Magnesium salt is used to a small extent in the dyeing industry. In some cases it is used in the treatment of leather to increase the fastness of the colour in washing. It is used extensively and in large quantities in medicine and for various purposes in the manufacture of textiles. In bleaching wool, magnesium sulphate is added to destroy the corrosive effect of sodium peroxide. It is also used for weighting textile fabric, especially silk. Mixed with gypsum and ammonium sulphate, it is used in the manufacture of non-inflammable fabrics.

"Prices for Epsom salts remained steady due to the discontinuance of supplies from European countries, hitherto the main sources of supply. Quotations for the technical grade, as given by Canadian Chemistry and Process Industries for Toronto or Montreal delivery, ranged from \$63 to \$65 per short ton in bags, whereas the B.P. material was quoted at \$3.60 per barrel throughout the years 1943 and 1944.

"When magnesium sulphate is not being made in Canada, imports are dutiable at the rate of 17½ per cent, otherwise the duty is 20 per cent. The tariff on the material entering the United States is ¼ cent per pound, or \$15 per ton." (Bureau of Mines, Ottawa.)

Table 315.—Production of Natural Magnesium Sulphate in Canada(*), 1935-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1935.....	340	7,965	1940.....		
1936.....	654	13,712	1941.....	265	7,343
1937.....	727	14,456	1942.....	1,140	38,760
1938.....	470	9,400	1943.....		
1939.....	550	9,900	1944.....		

(*) Produced entirely in British Columbia.

Table 316.—Magnesium Sulphate Used in Canadian Pharmaceutical Preparations and in Tanning, 1935-1944

Year	Pharmaceutical Preparations		Tanning	
	Pounds	Value	Pounds	Value
		\$		\$
1935.....	826,082	22,647	759,744	12,254
1936.....	878,120	23,162	1,115,965	15,120
1937.....	919,825	23,681	992,203	16,165
1938.....	855,547	23,687	1,272,549	14,153
1939.....	830,927	24,091	1,139,670	17,808
1940.....	925,945	31,554	1,646,217	34,242
1941.....	1,043,110	35,389	1,508,824	43,400
1942.....	1,077,601	38,352	1,782,479	45,956
1943.....	1,154,065	41,031	1,870,406	52,447
1944.....	1,123,482	46,886	1,863,100	53,566

Mineral Waters.—Shipments of natural mineral waters from Canadian springs in 1944 totalled 156,150 gallons valued at \$88,918 compared with 139,611 gallons worth \$67,541 in 1943.

Production during both years originated in Ontario and Quebec. Some of the more prominent Canadian mineral waters possessing special therapeutic or hygienic properties include the following: in Quebec, the Abenakis springs on the St. François river in Yamaska county; Potton Springs in Brome county and the Colombia spring at L'Epiphanie. In Ontario, saline, sulphur and gas springs occur at Caledonia Springs and at Carlsbad Springs, near Ottawa; the waters range from alkaline to strongly saline. St. Catharines, near Niagara, is one of the oldest Canadian mineral water resorts and sulphur waters are found at the Preston mineral springs in Waterloo county. The most famous of all Canadian springs is undoubtedly the group of hot sulphur springs at Banff, Alberta. In British Columbia the Harrison Hot Springs in the Fraser Valley and the Halcyon Hot Springs on Arrow Lake are noted for their curative properties.

The total number of firms reporting production of natural mineral waters in the Dominion was 15 in 1944, of which 12 were located in the province of Quebec and 3 in Ontario.

Table 317.—Shipments of Natural Mineral Waters from Canadian Springs, 1931-1944

Year	Quebec		Ontario		Canada	
	Imp. gal.	\$	Imp. gal.	\$	Imp. gal.	\$
1931.....	19,868	4,746	197,540	8,578	217,408	13,324
1932.....	15,506	4,697	61,208	2,473	76,714	7,170
1933.....	9,024	3,094	29,794	2,347	38,818	5,441
1934.....	75,665	16,116	21,775	1,622	97,440	17,738
1935.....	126,616	15,113	19,900	1,477	146,516	16,590
1936.....	131,186	17,399	23,100	1,117	154,286	18,516
1937.....	198,319	19,697	26,700	889	225,019	20,586
1938.....	159,893	19,033	28,416	2,586	188,309	21,619
1939.....	104,629	17,503	19,140	1,602	123,769	19,105
1940.....	109,025	18,466	31,638	2,426	140,663	20,892
1941.....	144,441	58,062	36,623	14,469	181,064	72,531
1942.....	129,062	60,316	28,023	14,189	157,085	74,505
1943.....	125,605	61,793	14,006	5,748	139,611	67,541
1944.....	148,965	88,113	7,185	805	156,150	88,918

Table 318.—Sales of Natural Mineral Waters (*) by the Canadian Aerated Waters Industry, 1930-1944

Year	\$	Year	\$
1930.....	178,348	1938.....	105,872
1931.....	140,730	1939.....	95,531
1932.....	92,066	1940.....	89,013
1933.....	77,125	1941.....	104,364
1934.....	52,113	1942.....	125,157
1935.....	45,100	1943.....	117,214
1936.....	63,687	1944.....	180,160
1937.....	102,648		

(*) Whether fortified or not.

"Phosphate.—All of the small output of phosphate in Canada consists of apatite, a common associate of the phlogopite mica mined in the Precambrian crystalline pyroxenites of southwestern Quebec and eastern Ontario. Apatite was mined on a considerable scale prior to 1900, but since then a large part of the comparatively small output has represented by-product material derived from operations for mica. During the present war there has been a slight renewal of interest in mining for straight apatite, and small tonnages have been produced from several of the larger old mines in Quebec that have been reopened. The largest output from these recent operations was obtained in 1941, when a total of 2,500 tons was produced. Though small, this tonnage exceeded the production in any other year since 1900. Total production since the inception of mining in 1870 is estimated at about 350,000 tons. Although there are probably substantial reserves of apatite in the above region, the deposits tend to be erratic and pockety, and are incapable of supplying more than a small fraction of the domestic requirements.

"In Quebec, most of the apatite has come from mines in territory contiguous to the Lièvre River in Papineau county, and mainly from Buckingham, Portland, Bowman, and Templeton townships.

"In Ontario, the apatite-bearing belt extends in a southwesterly direction through the Rideau Lakes section, chiefly in Lanark, Leeds, and Frontenac counties. Ontario Phosphate Company conducted a diamond-drilling program in 1944 on the old MacLaren property, in Bedford township, near Westport, sank a 3-compartment shaft to a depth of 175 feet, and opened a level at 150 feet, to tap ore indicated by drilling. In August, the company was reorganized as Ontario Phosphate Industries, Limited (Temple Building, Toronto).

"The sedimentary phosphate rock which occurs along the Rocky Mountains divide, notably in the Crowsnest area, is rather low grade and is not considered to be of present economic interest.

"Shipments of apatite in 1944 totalled 482 tons valued at \$6,716, compared with 1,451 tons valued at \$18,385 in 1943. Practically all of the production came from a property in Bowman township, operated by Robert Bigelow; the old High Rock mine in West Portland township, operated by O. C. Cote; and the old Phosphate King mine in Templeton township, operated by Blackburn Bros.; all of these properties being in Quebec. For many years Electric Reduction Company, Buckingham, Quebec, has purchased most of the apatite produced, for use in the production of elemental phosphorus and various phosphorus compounds. Canadian Refractories, Ltd., Kilmar, Quebec, also purchases small tonnages.

"Production of superphosphate by eastern Canadian plants in 1944 is estimated to have reached nearly 200,000 tons, or over double the pre-war output. This quantity supplied about 60 per cent of the domestic demand and the remainder was imported, mainly from the United States.

"Imports of sedimentary phosphate rock totalled 388,247 tons valued at \$1,710,378, compared with 260,846 tons valued at \$1,085,080 in 1943. Most of the material came from Florida and Montana. Imports included, also, a small tonnage of rock brought in ballast from Morocco, and a shipment of low-fluorine phosphate from Curacao, imported by the Feeds Administration for use in stock feeds.

"By far the greater part of the world production consists of sedimentary rock, of which the United States is the leading producer, its output in 1944 being estimated at about 5½ million tons.

"Most of the phosphate mined throughout the world is used for the manufacture of fertilizers. Ordinary superphosphate is the chief product made, but triple superphosphate, ammonium phosphate, and other compounds are produced on an important scale.

"Phosphate rock is the sole commercial source of phosphorus. As the element, and as a component in a wide variety of salts and compounds, phosphorus is used extensively in many industries.

"Actual consumption of phosphate rock in Canada in 1943, as reported by users, was 277,979 tons, of which 81 per cent went to the fertilizer trade, and 18 per cent into the production of phosphorus and phosphorus compounds. All of the fertilizer rock is used in three superphosphate plants of Canadian Industries Limited, located at Beloeil, Quebec; Hamilton, Ontario; and New Westminster, British Columbia; and in the plant of Consolidated Mining and Smelting Company, Trail, British Columbia.

"Cost of American-produced phosphate rock of 75 per cent grade, laid down at eastern Canadian points, in 1944 ranged from \$14 to \$19 per long ton. The price paid for Canadian apatite was \$16 per short ton, for material of 80 per cent grade, with a penalty or premium of 20 cents per unit below or above that figure.

"Phosphate rock enters Canada duty free. Superphosphate, for use as fertilizer in the condition imported, is free under the British preferential tariff, but under the intermediate tariff, pays 7½ per cent ad valorem, and under the general tariff, 10 per cent. Under the United States-Canada Trade Agreement of 1938, superphosphate imports from the United States are dutiable at 5 per cent, provided that no restrictions are placed by the United States Government on exports of either crude phosphate rock or superphosphate. Superphosphate intended for blending with other fertilizer ingredients, however, enters Canada free under all tariffs." (Bureau of Mines, Ottawa.)

Table 319.—Production of Phosphate in Canada, 1929-1944

Year	Short tons	\$	Year	Short tons	\$
1929.....	1,185	5,380	1937.....	100	900
1930.....	40	760	1938.....	208	1,886
1931.....			1939.....	157	1,712
1932.....	1,316	12,333	1940.....	358	4,039
1933.....	2,214	5,475	1941.....	2,487	33,376
1934.....	81	683	1942.....	1,264	17,431
1935.....	186	1,103	1943.....	1,451	18,385
1936.....	525	4,927	1944.....	482	6,716

Table 320.—Phosphate Rock and Superphosphate Used in the Manufacture of Canadian Fertilizers, 1931-1944

Year	Superphosphate		Phosphate Rock	
	Short tons	\$	Short tons	\$
1931.....	51,639	595,789	48,373	395,547
1932.....	36,005	366,462	41,114	316,518
1933.....	59,443	657,123	21,961	164,614
1934.....	73,182	839,980	48,007	396,133
1935.....	86,701	986,674	74,507	610,118
1936.....	97,515	1,103,222	60,924	438,948
1937.....	137,801	1,661,243	101,704	726,572
1938.....	180,243	2,193,699	102,125	765,816
1939.....	174,989	2,026,293	96,319	711,508
1940.....	175,045	2,175,615	143,667	1,262,847
1941.....	143,420	1,719,674	156,038	1,573,165
1942.....	177,421	2,748,290	207,842	2,253,517
1943.....	214,340	3,846,027	226,350	2,528,062
1944.....	231,184	3,805,659	337,632	3,817,626

Silica Sand.—The production of silica brick in Canada during 1944 totalled 3,997 M valued at \$312,092 compared with 4,165 M worth \$295,505 in 1943. The manufacture of these refractories was confined in both years to the plants of the Dominion Steel and Coal Company Ltd. at Sydney, Nova Scotia, and the Algoma Steel Corporation Ltd., Sault Ste. Marie, Ontario. The brick manufactured by both these firms are processed from crushed silica rock and are utilized in furnace construction and repairs.

Table 321.—Production of Silica Brick in Canada, 1928-1944

Year	M	\$	Year	M	\$
1928.....	3,224	155,502	1937.....	3,744	181,126
1929.....	3,951	173,581	1938.....	1,788	100,403
1930.....	2,418	97,379	1939.....	2,493	124,807
1931.....	900	35,746	1940.....	3,438	182,786
1932.....	93	4,304	1941.....	4,111	238,433
1933.....	636	23,185	1942 (*).....	4,273	263,006
1934.....	2,528	85,945	1943.....	4,165	295,505
1935.....	2,461	96,194	1944.....	3,997	312,092
1936.....	2,393	97,285			

(*) Largest annual output.

The value of silica brick imported into Canada in 1944 totalled \$713,538 compared with \$847,456 in 1943. Imports in 1944 came entirely from the United States.

“Sodium Carbonate (Natural).—Deposits of natural sodium carbonate, in the form of ‘Natron’ (sodium carbonate with 10 molecules of water) and also of brine, occur in a number of ‘lakes’ throughout the central part of British Columbia, chiefly in the Clinton mining division, about 20 miles northwest of Clinton, and in the neighbourhood of Kamloops.

“These deposits are far from the main eastern Canadian markets for sodium carbonate, and production is restricted to the requirements of consumers within economic rail-haul. Over the period since 1921, output from several of the deposits has been small and intermittent, amounting to 44 tons valued at \$484 in 1944, compared with 468 tons valued at \$5,148 in 1943, and shipped to Vancouver for soap manufacture.

“Eastern Canadian consumers of soda ash obtain their supplies from chemically prepared material made from salt by the Solvay or ammonia process in Ontario and the United States.

“Imports of soda ash or barilla in 1944 were 20,141 tons valued at \$583,653, compared with 70,557 tons valued at \$1,213,818 in 1943.

“Sodium carbonate, or soda ash, has many industrial uses, notably in the manufacture of glass and soap; in the purification of oils, and of bauxite for the production of aluminium; and in the flotation of minerals. Technological advances are continuing to increase the consumption of soda ash in the glass industry. Another major use of sodium carbonate is in the production of sodium hydroxide or caustic soda. A recent development is its use in the manufacture of ‘synthetic salt cake’ (anhydrous sodium sulphate). Substantial quantities of soda ash are also used in the smelting of iron ores.

“The special wartime demands of new munitions plants, of expansion in aluminium production, of increased utilization of low-graded ores, and of the higher operating schedules of the major consuming industries have contributed to a greatly increased consumption of soda ash during the war. The total Canadian consumption amounted to 89,400 tons in 1942, the latest year for which figures are available. The 1944 consumption appears to have been somewhat lower.

Table 322.—Production of Sodium Carbonate (Natural) in Canada, 1931-1944

Year	Tons	\$	Year	Tons	\$
1931.....	712	7,351	1938.....	252	2,268
1932.....	495	5,450	1939.....	300	2,400
1933.....	559	5,773	1940.....	220	1,780
1934.....	244	1,920	1941.....	186	1,488
1935.....	242	2,430	1942.....	256	2,048
1936.....	192	1,677	1943.....	468	5,148
1937.....	286	2,574	1944.....	44	484

Table 323.—Consumption of Soda Ash (Sodium Carbonate) in Specified Canadian Industries, 1943 and 1944

	1943		1944	
	Tons	Value \$	Tons	Value \$
Chemical and allied products (acids, salts, explosives, soaps, etc.)....	27,770	769,619	30,905	865,067
Manufacture of non-metallic minerals (including coke, gas, petroleum and glass).....	46,801	1,266,581	49,093	1,249,243
Pulp and paper industry.....	3,465	117,941	4,393	153,535
Dyeing, cleaning, etc.....	519	28,988	543	29,146
Textiles.....	346	13,294	208	8,007
Sugar refinery.....	174	8,257	114	5,125

The price of "soda ash" in 1944, as quoted in Canadian Chemistry and Process Industries, was \$2.00 per bag of 100 pounds throughout the year.

"Sodium Sulphate (Natural)."—Sodium sulphate occurs as crystals or in the form of highly concentrated brines in many lakes throughout Western Canada. Hydrated sodium sulphate, known as Glauber's salt, and anhydrous sodium sulphate, known to the trade as 'salt cake', are produced in Canada.

"Production has been mainly from Saskatchewan. A small tonnage of crude has been harvested intermittently in Alberta for local consumption as cattle lick, although sodium sulphate is the chief salt in a number of salt deposits in that province. Undeveloped deep-seated beds of sodium sulphate occur in southern New Brunswick.

"The production of natural sodium sulphate in 1944 amounted to 102,421 tons valued at \$987,842, compared with 107,121 tons valued at \$1,025,151 in 1943. The decrease is attributed to the shortage of labour. The operating plants in Western Canada are capable of producing over 900 tons of dried salts a day, and if necessary the tonnage could be greatly increased.

"Production in 1944 was entirely from Saskatchewan. The principal producers were: Natural Sodium Products, Limited, with plants at Bishopric and Hardene; Horseshoe Lake Mining Company, Ormiston; Midwest Chemical Company, Palo; and Sybouts Sodium Sulphate Company, Gladmar; all of which are in Saskatchewan. Small tonnages were also produced from several other properties.

"Natural Sodium Products' plant at Bishopric operated throughout the year and has a capacity of about 500 tons a day. The company also operated up to April, 1944, the deposit at Alsask Lake or Hardene where a 250-ton plant has been in operation since 1942. Midwest Chemicals, Limited, of Palo, with property at the central portion of Whiteshore Lake, operated throughout the year. Horseshoe Lake Mining Company operated, throughout 1944, its plant at Ormiston. Sybouts Sodium Sulphate Company operated its dehydrating plant at Sybouts Lake, 9 miles south of Gladmar. Chaplin Sodium Sulphate, Ltd., formed to develop Lake Chaplin sodium sulphate deposits. Dr. D. C. Hart of Regina, who has been operating a test plant, produced in a small way at Cabri and Snake Hole Lakes.

"Investigations of the sodium sulphate deposits in Western Canada was started by the Bureau of Mines, Ottawa, in 1921, and over 120,000,000 tons of hydrous salts was proved in the few deposits examined in detail. These deposits were described in Report No. 646, issued in 1926 and entitled 'Sodium Sulphate Deposits in Western Canada'.

"Complete figures for the world production of sodium sulphate were not available and it is difficult to compare the returns from different countries as the production comes from chemical plants and natural deposits. Germany, prior to the war, was probably the largest producer of sodium sulphate, and Canada was among the first ten producers. Canada is, however, one of the largest producers of sodium sulphate from natural deposits.

"Export figures of sodium sulphate are not available. Shipments from the deposits in Western Canada to the United States have shown a marked increase since the commencement of the war. Imports of sodium sulphate, including Glauber's salt (hydrated sodium sulphate), salt cake (anhydrous sodium sulphate) and nitre cake (sodium bisulphate), in 1944 were 22,044 tons valued at \$242,095, compared with 13,231 tons valued at \$191,283 in 1943.

"A discovery made in New Brunswick during 1937 may yet prove of importance as a source of sodium sulphate. New Brunswick Gas and Oilfields, Limited, in drilling for gas at Weldon, has proved large thicknesses of rock salt (sodium chloride). Two holes drilled 3,500 feet apart, from which cores were obtained, show the presence of a bed of glauberite ($\text{Na}_2\text{SO}_4\text{CaSO}_4$) from 60 to 100 feet thick, mostly overlying the rock salt. The sodium sulphate content of this bed ranges from 25 to 30 per cent. Glauberite and sodium chloride are present in other holes drilled in 1939, thus further extending the salts basin. Many millions of tons of sodium sulphate seem to be indicated in this deposit, the boundaries of which have not been fully determined. The Bureau of Mines, Ottawa, did much research work on the material recovered in these cores, and indicated a method of recovery of the sodium sulphate. Further detailed work is required to determine the commercial possibilities of the deposit.

"The material from Western Canada is shipped to the Pacific coast of Canada and the United States; east to Ontario, Quebec and the Maritimes; and south to the middle western States and to Louisiana.

"Glauber's salt is used widely in the chemical industries, and the demand is increasing. Sodium sulphate is used extensively in the pulp and paper (70,100 tons in 1942), glass, dye, and textile industries and to a smaller extent for medicinal purposes and for tanning. It is also used extensively (21,500 tons in 1942) in the form of nitre cake in the smelting of nickel-copper ores for the separation of these two metals.

"The price for natural anhydrous sodium sulphate from the deposits in Western Canada ranges from \$9 to \$10 per short ton f.o.b. plant. The delivered price is considerably higher owing to the high freight rates to the consuming plants, which are mostly in Eastern Canada." (Bureau of Mines, Ottawa.)

Table 324.—Production of Natural Sodium Sulphate (*) in Canada, 1930-1944

Year	Short tons	\$	Year	Short tons	\$
1930.....	31,571	293,847	1938.....	63,009	553,307
1931.....	44,957	421,097	1939.....	71,485	628,151
1932.....	22,466	271,736	1940.....	94,260	829,589
1933.....	50,080	455,416	1941.....	115,608	931,554
1934.....	66,821	587,986	1942.....	131,258	1,079,692
1935.....	44,817	343,764	1943.....	107,121	1,025,151
1936.....	75,598	552,681	1944.....	102,421	987,842
1937.....	79,804	617,548			

(*) All produced in the province of Saskatchewan with the following exceptions:

Includes production in: Alberta—1937—80 tons, value \$480
 1938—89 tons, value \$1,127
 1939—10 tons, value \$186
 1940—10 tons, value \$50
 1941—8 tons, value \$32

Table 325.—Sodium Sulphate or Salt Cake Used in Specified Canadian Industries, 1932-1944

Year	Textile Industry		Medicinal and pharmaceutical industry		Acids, alkalis and salts industry (*)		Wood-pulp	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
		\$		\$		\$		\$
1932.....					94	1,811	24,301	489,343
1933.....			39	4,879	9,968	146,201	29,563	580,251
1934.....			51	7,278	26,075	368,576	34,559	655,905
1935.....			50	4,617	22,485	316,734	35,350	642,801
1936.....			27	2,546	7,220	102,176	41,524	711,635
1937.....			29	2,234	8,006	113,054	50,584	884,437
1938.....	323	8,419	21	1,593	3,412	48,486	33,213	588,217
1939.....	401	11,636	24	1,940	11	314	40,685	722,178
1940.....	522	13,607	21	1,820	14	416	53,540	994,875
1941.....	884	25,390	34	3,073	10	326	61,679	1,133,625
1942.....	860	24,831	40	4,626	107	2,040	70,078	1,303,461
1943.....	734	21,039	38	4,142	120	1,868	67,292	1,306,215
1944.....	597	20,916	29	5,230	934	19,617	70,954	1,387,467

(*) Sodium sulphate used direct in smelting of nickel-copper ores included only for years 1933-1935 inclusive; in 1944 this consumption totalled 37,097 tons compared with 33,885 tons in 1943.

Table 326.—(*) Principal Statistics of Sodium Sulphate Mining Industry, 1943 and 1944

	1943	1944
Active firms.....No.	5	5
Producing plants.....No.	6	6
Salaried employees.....No.	15	17
Wage-earners.....No.	177	141
Total Employees.....No.	192	158
Salaries.....\$	30,653	31,007
Wages.....\$	243,643	232,997
Total Salaries and Wages.....\$	274,296	264,004
Gross value of production.....\$	1,025,151	987,842
Cost of fuel and electricity.....\$	342,566	253,043
Cost of process supplies.....\$	61,231	39,722
Net Value of Production.....\$	621,354	695,077

(*) Data included with those shown in Tables 331 to 334.

Strontium Minerals.—There was no commercial production of strontium minerals in Canada during recent years. In 1941, 27 tons of celestite valued at \$280 were shipped from old dumps located on lots 6 and 7, concession 10 of Bagot township, Renfrew county, Ontario.

The following, relating to strontium, is from a review prepared by the Bureau of Mines, Ottawa:

"Several occurrences of celestite (strontium sulphate) of possible economic interest are known in Canada, and in 1920-21, some ground material produced from a deposit in Bagot township, Ontario, was sold to the paint trade. The material from this deposit is coarsely fibrous in character and is not very pure, containing about 18 per cent of barium sulphate. It is accordingly not favoured for chemical use, but is regarded as suitable for paints and general filler or loader use. The old pit was pumped out in 1941 and a few tons of ore were scaled down from a small drift. This, along with some stockpile material, was shipped to Montreal for grinding. The product was used in the paint trade as a substitute for barite, but is reported to have found little favour, and no further work was done. Celestite of similar character and analysis occurs at some of the old fluorspar mines of the Madoc area in Ontario, and part of it might be recoverable from the waste dumps.

"Celestite, analysing 98 to 99 per cent strontium sulphate occurs as a small vein of coarse platy crystals in Lansdowne township, Ontario and some of it was mined many years ago.

"World production of strontium minerals is estimated at 5,000 to 7,000 tons a year. England is the principal source of supply, with Germany next. The United States produced about 350 tons in 1940, exclusive of celestite used for oil-drilling. Important deposits are reported to occur in India and Newfoundland, but there has been no production from these sources as yet.

"Celestite is the principal source of strontium used in the manufacture of the various strontium salts, and strontianite, a less common mineral, is used for the same purpose. The nitrate, carbonate, and hydrate are the most important of the strontium compounds used in industry and medicine. Strontium nitrate is employed mainly in pyrotechnics, for fireworks, railroad signal flares, and military flares and rockets to which it imparts the characteristic strong red flame colour of the element. Other strontium compounds are employed in tracer bullets and shells. The hydrate is used chiefly in the refining of beet sugar by the Scheibler process. In North America, however, sugar is refined mainly by the Steffens, or lime, process. The carbonate is reported to be used to some extent as a batch ingredient in the manufacture of certain kinds of glass, glazes, and enamels, and as a fluxing and desulphurizing and dephosphorizing agent in iron and steel. Strontium chloride powder finds limited use in refrigerators working on the solid absorption principle. Ground celestite is used in fairly large quantities

for purifying caustic soda in the rayon industry, and some impure material has been ground and employed as a barite substitute for weighting oil-drilling muds. Interest has also been shown in the possibilities of the carbonate and the sulphate in glass and white wares.

"Strontium metal, made from either the natural sulphate or carbonate, is used in limited quantities in certain alloys, mainly of copper, tin, lead, zinc, and cadmium."

"E and M J Metal and Mineral Markets", New York, quoted celestite, October, 1945—per ton in carload lots, 92 per cent SrSO_4 finely powdered, \$45. Strontianite—per ton, lump in carload lots, minimum 84 to 86 per cent SrCO_3 , \$55 Nominal.

Data pertaining to imports of strontium minerals or compounds are not shown separately in Canadian trade reports.

"Sulphur (Including Pyrites).—Deposits of native sulphur of commercial grade have not been found in Canada, but sulphur occurs in combination with copper, lead, zinc, nickel, or iron in many base metal sulphide ore-bodies in various parts of the country. In the smelting of these ores sulphur dioxide gas is produced, but prior to 1925 this gas was a total waste as no facilities were available for the recovery from it of sulphur, or sulphur compounds. In practice this gas can be used directly for the manufacture of sulphuric acid, the production of liquid sulphur dioxide, or for the production of elemental sulphur. Sulphur used in the making of sulphuric acid is recovered from salvaged smelter gas in Ontario and British Columbia. Sulphuric acid is also made from pyrites by Nichols Chemical Company at its plants in Quebec, Ontario, and British Columbia.

"International Nickel Company's sulphuric acid plant at Copper Cliff, Ontario, which was erected in 1930, employs the contact process in the manufacture of acid from converter gas for the recovery of portions of its smelter gases. A plant has been in operation since 1925 at the Coniston smelter of the same company. These plants have been enlarged during the war and were operated at capacity during 1944. A plant using the contact process was erected in 1929 at Trail, British Columbia, by Consolidated Mining and Smelting Company.

"The high-grade sulphuric acid produced in the plant at Copper Cliff is marketed in several industries, and the acid made in the Trail plant is used chiefly for the manufacture of fertilizers. This plant commenced producing elemental sulphur from the smelter gases in 1936. This operation was continued until July, 1943, when the demand for sulphuric acid for fertilizer manufacture became so great that the production of elemental sulphur had to be discontinued. The lower tonnage of lead and zinc concentrates from the Sullivan mine at Kimberley tended to reduce sulphuric acid production in 1944, and it was necessary to ship and roast a large tonnage of Sullivan iron tailings to supply some of the acid required for fertilizers. Chemical and fertilizer production in 1944 broke all previous records. Sulphuric acid output in terms of 100 per cent acid was 331,700 tons, and fertilizer output was 327,200 tons.

"No plant in Canada is producing liquid sulphur dioxide from smelter gases, although this has been done experimentally.

"In British Columbia, part of the large output of pyrites from the Britannia mine at Britannia Beach was consigned to the acid plant of Nichols Chemical Company at Barnet, British Columbia, and part was exported to plants in the United States. A considerable tonnage of pyrites from previous years' operations has accumulated at Britannia Beach and is awaiting more favourable market conditions.

"In Quebec, at the plant of Noranda Mines, Limited, pyrites concentrate, a by-product of the milling of copper-gold ores, was marketed for the manufacture of acid used partly by the chemical industry and partly in the manufacture of pulp and paper by the sulphite process. Sulphuric acid is produced by Nichols Chemical Company at its plants at Valleyfield, Quebec, at Sulphide, Ontario, and at Barnet, British Columbia. The company obtains its sulphur from the roasting of pyrites.

"Iron pyrites concentrate is also produced in Quebec by Waite-Amulet Mines Limited, and in 1944 a relatively small tonnage of pyrites was also shipped from an old stock pile located at the Aldermac mine in Beauchastel township.

"Exports were: pyrites (sulphur content) 90,836 tons valued at \$353,441, compared with 104,509 tons valued at \$409,597 in 1943; sulphuric acid 18,960 tons valued at \$269,133, compared with 31,414 tons valued at \$481,749 in 1943. No exports of elemental sulphur are recorded.

"Imports of sulphur in all forms (crude, brimstone, etc.) were 235,955 tons valued at \$3,875,649, compared with 218,527 tons valued at \$3,524,006 in 1943. Imports of sulphuric acid were 190 tons valued at \$24,542, compared with 220 tons valued at \$28,095 in 1943.

"World production of elemental sulphur is estimated by the U.S. Bureau of Mines at over 4,300,000 long tons.

"The United States is the main source of the world production of crude sulphur. The output in 1942 amounted to 3,460,700 long tons, chiefly from the states of Texas and Louisiana.

"Sulphur is used in Canada chiefly in the production of sulphite pulp (211,500 tons in 1942) and for use in the making of artificial silk. It is used to a large extent also in the manufacture of sulphuric acid, explosives, and rubber, and in the production of fertilizers.

"Sulphur is one of the essential raw materials for war, such as, in the form of sulphuric acid for making explosives. The rayon industry consumes large quantities of sulphur. The expansion of the pulp and paper industry has also created increased demand for sulphur. With the construction of new sulphuric plants in Canada and the United States the consumption of sulphur was increased gradually throughout the war period.

"According to 'Metal and Mineral Markets', New York, the price of sulphur in 1944 remained unchanged at \$16 a long ton, f.o.b. mines. The prices at consumers' plants in Canada vary from \$20 to \$32 according to location, the difference being due to transportation costs. The average for the Dominion in 1943 was about \$27.

"Pyrites is used in the making of sulphate pulp by E. B. Eddy Company, Hull, and by St. Lawrence Paper Mills Company, Trois Rivières, Quebec. A considerable tonnage is used in the making of sulphuric acid at the chemical plants of Nichols Chemical Company at Valleyfield, Quebec, Sulphide, Ontario, and Barnet, British Columbia.

"There is apparently no standard price in Canada for sulphur in pyrites. Most contracts are believed to be based on a price of 5 cents (or better) per unit (22.4 pounds) of sulphur per long ton, f.o.b. cars at point of production." (Bureau of Mines, Ottawa.)

Table 327.—Production of Sulphur (*) in Canada for Years Specified

Year	Tons	\$	Year	Tons	\$
1886.....	(a) 42,906	193,077	1928.....	(b) 38,589	321,033
1896.....	13,823	101,155	1929.....	42,781	350,848
1906.....	17,525	169,990	1930.....	37,730	314,885
1913.....	65,012	521,181	1931.....	50,107	429,557
1914.....	93,609	744,508	1932.....	53,172	470,014
1915.....	116,157	985,190	1933.....	57,373	510,299
1916.....	116,975	1,084,095	1934.....	51,597	515,502
1917.....	155,453	1,610,762	1935.....	67,446	634,235
1918.....	154,269	1,705,219	1936.....	122,132	1,033,055
1919.....	65,674	522,704	1937.....	130,913	1,154,992
1920.....	67,608	719,110	1938.....	112,395	1,044,817
1921.....	12,213	116,326	1939.....	211,278	1,668,025
1922.....	6,900	74,303	1940.....	170,630	1,298,018
1923.....	11,073	113,020	1941.....	260,023	1,702,786
1924.....	9,742	95,620	1942.....	303,714	1,994,891
1925.....	7,587	58,899	1943.....	257,515	1,753,425
1926.....	8,975	63,899	1944.....	248,088	1,755,739
1927.....	25,229	198,388			

(*) Sulphur in iron pyrites shipped plus sulphur recovered from non-ferrous smelter gases.

(a) Tonnage of pyrites shipped.

(b) 1928-1944 includes sulphur recovered from smelter gas.

Table 328.—Production in Canada of Pyrites with Sulphur Content, including Sulphur Contained in Sulphuric Acid, Etc., Made From Smelter Gases, 1942-1944

—	Pyrites (*)			Smelter gas		Total sulphur	
	Sales	Sulphur content		Sulphur content		Tons	Value
	Tons	Tons	Value	Tons	Value		
1942			\$		\$		\$
Quebec.....	351,570	168,832	673,965	18,634	186,340	168,832	673,965
Ontario.....				(†) 102,301	1,023,010	18,634	186,340
British Columbia.....	27,923	13,947	111,576			116,248	1,134,586
Canada.....	379,493	182,779	785,541	120,935	1,209,350	303,714	1,994,891
1943							
Quebec.....	277,690	136,007	545,229	16,907	169,070	136,007	545,229
Ontario.....				(†) 101,159	1,011,590	16,907	169,070
British Columbia.....	6,886	3,442	27,536			104,601	1,039,126
Canada.....	284,576	139,449	572,765	118,066	1,180,660	257,515	1,753,425
1944							
Quebec.....	240,370	116,887	453,501	17,876	178,760	116,887	453,501
Ontario.....				108,439	1,084,390	17,876	178,760
British Columbia.....	9,701	4,886	39,088			113,325	1,123,478
Canada.....	250,071	121,773	492,589	126,315	1,263,150	248,088	1,755,739

(*) Recovered from copper ore deposits.

(†) Includes any elemental sulphur and sulphur in sulphuric acid and direct ammonium sulphate.

Table 329.—Consumption of Sulphur by Specified Canadian Industries, 1940-1943

Industry	1942		1943		1944	
	Tons	\$	Tons	\$	Tons	\$
Wood-pulp.....	211,466	5,687,331	206,766	5,739,113	195,203	5,435,481
Petroleum refining.....	31	1,561	47	2,360	51	2,628
Acids, alkalies and salts.....	65,056	1,694,232	69,236	1,866,322	123,283	1,828,479
Matches.....	80	4,119	76	3,997	75	4,097
Explosives.....	2,057	57,631	1,806	55,717		
Insecticides.....	1,293	50,310	1,246	34,449	1,228	37,769
Adhesives.....	89	3,087	93	2,847	70	2,058
Chemicals, miscellaneous.....	‡	27	7	393	7	790
Rubber.....	1,728	93,042	1,412	76,032	1,259	68,842
Sugar.....	142	7,411	104	4,913	108	5,078
Fruit and vegetable preparations.....	130	10,685	215	15,610	156	11,198
Other industries (*).....	287	12,248	272	11,466	240	10,272

(*) Starch and glucose, dyeing and finishing of textiles.

Imports into Canada of sulphur and brimstone totalled 235,955 short tons valued at \$3,875,649 in 1944. The sulphur content of iron pyrites exported from Canada in 1944 totalled 90,836 short tons appraised at \$353,441.

"Volcanic Dust.—Volcanic dust (pumicite or pumice dust) is a natural glass or silicate, atomized by volcanic explosions and thrown into the air in great clouds which ultimately settle, forming beds of varying thickness, often hundreds of miles from its source. In many instances the dust has been washed down from higher levels and redeposited by the agency of waters, in which case the beds are stratified and mixed with foreign substances. It consists of aluminium silicate (80 to 90 per cent) and of oxides and silicates of iron, sodium, magnesium, calcium, etc.

"Deposits of volcanic dust are found in Saskatchewan, Alberta, and British Columbia. There has been intermittent production from Waldeck, near Swift Current, and at Rockglen, 125 miles southeast of Swift Current, in Saskatchewan, and from near Williams Lake in British Columbia. There was no production in 1944, but in 1943 about 60 tons were shipped from the Rockglen deposit for insulation purposes.

"Imports are grouped with a number of similar products (pumice, pumice stone, lava, and calcareous tufa), the value of which totalled \$27,880 in 1944. Most of the pumice dust was used in scouring powders.

"The United States is the world's largest consumer of volcanic dust and pumice and has an annual output of over 125,000 tons. Consumption is mainly for scouring and cleansing compounds and as a concrete admixture and concrete aggregate. Minor uses are for insulation, glass bevelling, polishing aluminium, in the manufacture of fire-proof walls, building tiles, and as glazes in ceramics." (Bureau of Mines, Ottawa.)

Prices are not quoted, but in the United States sales values in 1944 for cleansing and scouring were about \$7.50 per ton; for acoustic plaster \$27, for concrete admixture and aggregate, \$1.25 per ton.

In 1945 pumice stone per pound f.o.b. New York or Chicago, in barrels, powdered 2½ cents to 4½ cents; lump 5 to 7½ cents. Tripoli per ton, burlap bags, paper liners, minimum carload 30 tons, f.o.b. Missouri, 4 mesh, rose and cream coloured \$14.50; 110 mesh \$16; air floated 200 mesh \$26. (Bureau of Mines, Ottawa.)

Table 330.—Production of Miscellaneous Non-Metallic Minerals in Canada, 1943 and 1944

Item	Unit of measure	1943		1944	
		Quantity	Value \$	Quantity	Value \$
Barite.....	ton	24,474	279,253	118,719	1,023,696
Corundum.....	ton			173	17,830
Diatomite.....	ton	98	3,331	134	437
Fluorspar.....	ton	11,210	318,424	6,924	217,701
Garnets (schist).....	ton			3	125
Graphite.....	ton	1,903	197,431	1,582	179,457
Grindstones (b).....	ton	164	6,225	225	12,000
Magnesian dolomite (c).....			1,260,056		1,139,281
Mineral waters.....	Imp. gal.	139,611	67,541	156,150	88,918
Phosphate (a).....	ton	1,451	18,385	482	6,716
Silica brick.....	M	4,165	295,505	3,997	312,092
Sodium carbonate.....	ton	468	5,148	44	484
Sodium sulphate.....	ton	107,121	1,025,151	102,421	987,842
Volcanic dust.....	ton	50	257		
Total (Gross).....			3,476,707		3,986,579
Sulphur production (*).....	ton	257,515	1,753,425	248,088	1,755,739

(a) Represents apatite mined in Quebec and Ontario, usually a by-product in mica production.

(b) Includes sharpening stones, etc.

(c) Includes the value of calcined brucite granules shipped from Wakefield, Que.

(*) Includes sulphur content of pyrites at its sales value and estimated figures for quantity and value of sulphur in smelter gases used for acid making or recovered as elemental sulphur, or in ammonium sulphate (direct). General statistics relating to production of sulphur included with those of the copper-gold mining and non-ferrous smelting industries.

Table 331.—Principal Statistics Relating to Miscellaneous Non-Metal Mining Industries in Canada, 1943 and 1944

	1943	1944
Number of plants.....	54	52
Capital employed..... \$	3,522,842	
Number of employees—On salary.....	84	116
On wages.....	827	749
Total.....	911	865
Salaries and wages—Salaries..... \$	155,593	240,499
Wages..... \$	1,207,933	1,259,751
Total..... \$	1,363,526	1,500,250
Selling value of products (gross)..... \$	3,476,707	3,986,579
Cost of fuel and electricity..... \$	823,347	706,929
Cost of process supplies used..... \$	382,648	462,999
Cost of containers..... \$	2,475	18,932
Selling value of products (net)..... \$	2,268,237	3,986,579

Table 332.—Wage-Earners, by Months, in the Miscellaneous Non-Metal Mining Industries in Canada, 1940-1944

Month	1940	1941	1942	1943	1944				
					Mine			Mill	
					Surface		Under-ground	Male	Female
					Male	Female			
January.....	352	451	561	835	154	2	64	470	
February.....	352	463	594	798	142	2	66	437	
March.....	392	452	600	822	144	2	62	471	
April.....	359	473	622	810	178	2	47	432	
May.....	482	559	639	838	264	2	61	460	
June.....	472	682	827	879	288	3	63	464	
July.....	548	667	789	849	283	4	63	483	
August.....	517	696	819	869	266	4	69	453	
September.....	604	695	770	860	254	3	55	426	
October.....	614	718	789	781	258	3	55	490	
November.....	581	659	803	809	246	7	53	505	
December.....	451	603	759	711	170	1	34	479	
Average.....	480	601	723	827	222	5	58	464	

Table 333.—Hours Worked Per Week by Wage-Earners, 1944 (In one week of month of highest employment)

Hours worked per week	Number of Wage-earners	
	Male	Female
30 hours or less.....	60	
31-43 hours.....	84	1
44 hours.....	16	
45-47 hours.....	27	
48 hours.....	104	
49-50 hours.....	43	
51-54 hours.....	87	
55 hours.....	58	
56-64 hours.....	215	
65 hours and over.....	177	
Total.....	961	1
Total wages paid in selected week..... \$	30,431	26

Table 334.—Fuel and Electricity Used in the Miscellaneous Non-Metal Mining Industries in Canada, 1943 and 1944

Kind	Unit of measure	1943		1944	
		Quantity	Cost	Quantity	Cost
			\$		\$
Bituminous coal—Canadian.....	ton	21,248	104,183	13,511	70,231
Imported.....	ton	31,637	281,454	30,531	281,254
Anthracite—From the United States.....	ton	11	195	20	336
Other.....	ton	3	35		
Lignite coal.....	ton	18,839	59,488	21,334	65,667
Coke.....	ton			7	86
Gasoline.....	Imp. gal.	167,998	48,116	128,206	31,934
Kerosene or coal oil.....	Imp. gal.	1,745	355	814	164
Fuel oil and diesel oil.....	Imp. gal.	2,590,358	220,049	1,813,508	107,531
Wood (cords of 128 cubic feet).....	cord	2,379	9,570	3,737	23,336
Gas—Manufactured.....	M cu. ft.	114,213	11,707	217,314	32,032
Natural.....	M cu. ft.				
Other.....					
Electricity purchased.....	K.W.H.	8,782,586	88,195	9,578,007	94,358
Total			823,347		706,929
Electricity generated for own use.....	K.W.H.	2,699,998		6,497,349	

CHAPTER NINE

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

Including Cement, Clay and Clay Products (Brick, Drain Tile, Kaolin, Sewer Pipe, Structural Tile, Stoneware and Pottery made from Domestic Clays, Fireclay, Firebrick, Fireclay Blocks and Shapes, Imported Clay Products), Lime, Sand and Gravel, Sand-Lime Brick, and Stone, including Slate.

Grouped in this Chapter are those industries producing structural materials from non-metallic minerals, rocks and clays of Canadian origin. These industries include those firms engaged in the production of Clay Products, Portland Cement, Lime, Sand, Gravel and Stone.

The combined value of these materials produced in Canada during 1944 totalled \$42,984,937 compared with \$42,010,254 in 1943. Of the 1944 output, Ontario contributed \$15,716,361 and Quebec \$14,597,540 or 36.6 per cent and 34 per cent respectively. In order of importance, lesser amounts were also produced in British Columbia, Manitoba, Alberta, New Brunswick and Nova Scotia.

The quality of structural materials produced in Canada compares favourably with that of other countries. Most of the larger plants producing cement, clay products, lime, stone and sand and gravel are equipped with modern machinery and the Dominion is endowed with practically inexhaustible deposits of most primary materials required in any building or construction project of the future.

There has been an increasing consumption of stone and lime for other than building purposes. This has been particularly evident in recent years and is the result of expansion in certain industries where these materials are utilized in various chemical processes. Shipments of stone and lime for these purposes are classified, for convenience, with data relating to production of these same materials for structural purposes. However, statistics pertaining to their consumption for industrial purposes are segregated in the following tables.

Table 335.—Gross Value of Clay Products and Other Structural Materials Produced in Canada, by Provinces, 1939-1944

Province	1939	1940†	1941	1942	1943	1944
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	1,829,207	1,855,771	1,330,888	1,980,912	1,597,791	1,081,805
New Brunswick.....	1,911,041	938,161	1,145,412	1,305,343	911,121	1,644,047
Quebec.....	12,319,773	15,001,749	16,631,657	17,723,293	15,893,115	15,085,337
Ontario.....	12,856,694	16,636,844	18,652,999	16,557,804	15,414,625	16,088,455
Manitoba.....	1,646,797	2,600,304	2,197,095	2,817,933	2,402,647	2,648,430
Saskatchewan.....	556,973	906,181	631,732	707,123	932,412	864,082
Alberta.....	1,947,453	2,971,550	2,626,277	2,636,160	2,752,839	3,149,234
British Columbia.....	2,314,821	2,795,389	3,416,996	3,564,405	3,246,623	3,573,857
Canada—Gross Value.....	35,382,759	43,703,949	46,633,056	46,992,973	43,121,073	44,135,247
Net value.....	29,628,817	34,893,571	35,865,916	35,334,369	32,464,633	32,916,190

(†) Includes value of cement containers 1940 to 1944.

NOTE: For statistics relating to employment, etc., in these combined industries see totals in Tables 27 and 28, Chapter 1.

Table 336.—Value of Construction Contracts Awarded, by Provinces, 1939-1944
(MacLean Building Reports Ltd.)

Province	1939	1940	1941	1942	1943	1944
	\$	\$	\$	\$	\$	\$
Maritimes.....	16,146,800	21,142,100	36,736,400	26,305,500	14,875,400	19,713,100
Quebec.....	62,846,600	96,326,300	154,541,200	92,235,500	61,816,700	89,884,800
Ontario.....	82,605,500	146,806,100	145,598,600	108,679,500	83,025,300	111,741,800
Manitoba.....	5,374,400	28,003,700	11,701,600	13,914,300	10,083,900	12,906,400
Saskatchewan.....	3,246,100	12,566,700	11,098,700	5,480,200	3,970,000	5,677,600
Alberta.....	5,234,900	23,940,100	15,598,800	14,401,100	13,529,300	19,501,900
British Columbia.....	11,724,700	17,224,800	18,716,000	20,578,000	13,803,300	32,536,200
Canada.....	187,178,500	346,009,800	393,991,300	281,594,100	206,103,900	291,961,800

Table 337.—Total Value of Work Performed in Canada by General and Trade Contractors (including Subcontractors), Municipalities, Harbour Commissions, Provincial and Dominion Government Departments 1937 to 1944

(Construction Branch, Dominion Bureau of Statistics)

	\$
1937.....	351,874,114
1938.....	353,223,285
1939.....	373,203,680
1940.....	474,122,778
1941.....	639,750,624
1942.....	635,649,570
1943.....	572,426,551
1944.....	449,838,059

Table 338.—Types of Canadian Construction 1941-1944

(Construction Branch, Dominion Bureau of Statistics)

*Type of Construction	1941	1942	1943	1944
	\$	\$	\$	\$
Total Value of Construction.....	639,750,624	635,649,570	572,426,551	449,838,059
Building Construction.....	374,491,173	351,774,680	301,884,888	220,299,940
Residential.....	87,586,340	76,346,090	63,684,367	83,927,360
Institutional.....	15,174,464	14,246,025	13,145,233	21,005,720
Commercial.....	41,157,146	30,638,065	26,439,561	29,233,965
Industrial (includes factories, warehouses, mine buildings, etc.).....	177,698,268	159,346,630	140,396,554	71,131,759
Other (includes armouries, barracks, hangars, etc.).....	52,874,955	71,197,840	58,216,173	15,001,136
Engineering, Harbours, Rivers, etc.....	200,656,038	217,279,062	203,527,830	153,123,802
Streets, highways, etc.....	68,358,529	59,619,536	66,582,959	68,387,994
Bridges, watermains, sewers, dams, reservoirs, etc.....	40,490,145	34,044,730	30,256,377	22,020,560
Electric stations and transmission lines.....	37,090,038	60,697,808	30,843,814	19,919,488
Docks, wharves, piers, etc.....	6,475,872	10,099,471	10,282,332	5,819,364
Other engineering (includes landing fields, parks, canals, dredging, pile driving, etc.).....	48,241,454	52,817,517	65,562,348	36,982,396
Building Trades (Jobbing).....	64,603,413	66,595,828	67,013,833	76,414,317

* This survey is based on reports received from General and Trade Contractors and Subcontractors, Municipalities, the Harbours Board and Dominion and Provincial Departments, and covers alterations, maintenance and repairs, as well as new construction.

Table 339.—The following table gives the total value of construction contracts awarded in Canada from 1925 to 1944, also index numbers of wholesale prices of building materials, and index numbers of wage rates.

Year	Value of construction contracts awarded in Canada	Average index numbers of employment in building construction (1926=100)	Average index numbers of wholesale prices of building materials (1926=100)	Index of wage rates in the building trades (1939=100)
	(a)	(b)	(c)	(d)
	\$			
1925.....	297,973,000	75.8	102.9	99.8
1926.....	372,947,900	100.0	100.0	100.0
1927.....	418,951,600	108.7	96.1	105.0
1928.....	472,032,600	112.0	97.4	108.7
1929.....	576,651,800	135.3	99.0	115.8
1930.....	456,999,600	134.3	90.8	119.1
1931.....	315,482,000	104.3	81.9	114.7
1932.....	132,872,400	54.1	77.2	104.5
1933.....	97,289,800	38.5	78.3	92.5
1934.....	125,811,500	47.8	82.5	90.7
1935.....	160,305,000	55.4	81.2	93.6
1936.....	162,588,000	55.4	85.3	94.2
1937.....	224,056,700	60.1	94.4	96.9
1938.....	187,277,900	60.1	89.1	99.2
1939.....	187,178,500	62.1	89.7	100.0
1940.....	346,009,800	83.5	95.6	104.5
1941.....	393,991,300	139.5	107.3	111.6
1942.....	281,594,100	157.9	115.2	118.6
1943.....	206,103,900	160.3	121.2	127.7
1944.....	291,961,800	95.3	127.3	129.6

(a) Compiled by MacLean Building Reports Ltd.

(b) Employment Statistics Branch, Dominion Bureau of Statistics.

(c) Internal Trade Branch, Dominion Bureau of Statistics.

(d) Labour Department.

Table 340.—Production of Structural Steel Shapes and Certain Other Materials in Canada, 1942 1943

	Unit	1942		1943	
			\$		\$
Structural steel shapes (sales).....	tons	191,319	10,540,658	151,674	8,802,273
Lumber.....	M. ft. b. m.	4,935,145	149,854,527	4,363,575	151,899,684
Lath (wood).....	M	181,994	737,874	114,029	554,278
Shingles (wood).....	squares	3,720,482	13,191,084	2,565,752	10,020,804
Shingles (asphalt).....	squares	708,706	3,492,603	864,188	4,202,891
Insulating board (rigid 1/2").....	M. sq. ft.	138,038	4,179,747	140,626	4,505,113
Gypsum wall board.....	sq. ft.	164,410,695	3,849,253	192,185,195	4,317,946
Gypsum hard wall plasters.....	ton	51,475	682,528	39,883	501,104
Other gypsum products.....			298,181		597,995
Cement brick.....			42,434		97,034
Cement hollow blocks, etc.....			906,882		722,213
Artificial stone (cement).....			173,106		170,914
Cinder blocks.....	M		210,402	1,819	164,535
Sand-lime brick.....	M	12,472	169,716	9,088	123,268
Rock wool.....			1,417,258		1,707,501

THE CEMENT MANUFACTURING INDUSTRY

Producers' sales of Portland cement in 1944, as reported by the Canadian cement industry, totalled 7,190,851 barrels (350 pounds each) valued at \$11,621,372 compared with 7,302,289 barrels worth \$11,599,033 in 1943. Of the 1944 sales 3,249,302 barrels were produced in Quebec plants; 1,863,210 barrels in Ontario; 865,756 barrels in Manitoba; 699,989 barrels in Alberta and 512,594 barrels in British Columbia. Imports into Canada of finished Portland cement, other than in cement manufactures, totalled 14,004 barrels valued at \$76,838 in 1944; exports of cement in the same period amounted to 210,449 barrels worth \$377,434. The high and low Canadian producers' prices per barrel in 1944 were, respectively, \$2.70 and \$1.25.

The following tonnages of primary materials of mineral origin were used during 1944 in the manufacture of the final product: Limestone, 1,865,597; clay, 173,728; shale, 74,303; gypsum, 42,672; silica sand, 23,942 and iron oxides, 3,924.

The number of firms reporting commercial production of Portland cement in Canada during 1944 was 3 and the plants in operation numbered 8. The industry distributed \$2,254,775 in salaries and wages to 1,207 employees. The total value of fuel and electricity used during the year under review amounted to \$3,197,955, of which \$2,366,396 were expended for coal and \$786,765 for purchased electricity. Process supplies consumed, including chemicals, explosives, drill steel, gypsum, silica sand, purchased limestone, etc., were valued at \$2,566,432; included in this total were \$1,025,369 covering the cost of containers.

Portland cement, the principal raw materials for which are limestone and clay, is manufactured in five provinces of Canada. In addition to the standard of ordinary variety of Portland cement several other varieties, including high-early-strength, alkali-resistant, and white cement are made in this country, the last named, however, is made from imported clinker.

All Canadian plants except one making cement from domestic raw materials are using the wet process. Remarkable uniformity in the chemical and physical properties of the standard variety of cement is achieved throughout the country as the result of close technical control and improvements in plant equipment.

Complete data relating to world production of cement have not been available for some years.

The following information was supplied by the British Columbia Cement Company Limited:

"The B.C. Cement Company, Limited, after six years of wartime production, during which period heavier demands were made on the company than ever before, are now engaged in a very large and extensive renovation programme at their Bamberton plant, which will include the purchase of a new and modern kiln, and entire new coal grinding system, and a change in raw materials. Very substantial capital expenditures are planned for increased capacity and the entire plant will be modernized within the next two or three years."

In 1944 Canada Cement Company, Limited operated plants at Hull and Montreal East in Quebec; at Port Colborne and Belleville in Ontario; at Fort Whyte, Manitoba; and at Exshaw, Alberta. St. Mary's Cement Company, Limited operated a plant at St. Mary's, Ontario, Medusa Products Company of Canada, Limited has a plant at Paris, Ontario, making white cement, cement paints, etc., from imported clinker. British Columbia Cement Company operates at Bamberton, British Columbia. The total rated daily capacity of all plants is about 37,000 barrels (a barrel of cement weighs 350 pounds net).

Table 341.—Summary Statistics of Cement Production, Sales, Etc., in Canada, 1943 and 1944

	1943		1944	
	Barrels (*)	Value	Barrels (*)	Value
		\$		\$
Output.....	8,025,113		7,601,007	
Sold or used.....	7,302,289	11,599,033	7,190,851	11,621,372
Stocks on hand December 31.....	1,596,643		2,606,799	
IMPORTS—				
Portland cement and hydraulic or water lime.....	18,577	83,975	14,004	76,838
Portland cement clinker (white).....	6,778	13,861	9,872	21,130
Manufactures n.o.p.....		27,723		21,128
EXPORTS—				
Portland cement.....	172,601	344,004	210,449	377,434
Apparent consumption.....	(a)7,143,265		(a)6,994,406	

(*) 1 barrel = 350 pounds.

(a) Exclusive of clinker imported.

Table 342.—Production and Apparent Consumption of Cement in Canada, 1935-1944

Year	Sold or Used		Apparent Consumption
	Barrels	\$	Barrels
1935.....	3,648,086	5,580,043	3,610,217
1936.....	4,508,718	6,908,192	4,479,656
1937.....	6,168,971	9,095,867	6,157,485
1938.....	5,519,102	8,241,350	5,478,180
1939.....	5,731,264	8,511,211	5,591,328
1940.....	7,559,648	11,775,345	7,272,886
1941.....	8,368,711	13,063,588	8,069,824
1942.....	9,126,041	14,365,237	8,878,481
1943.....	7,302,289	11,599,033	7,148,265
1944.....	7,190,851	11,621,372	6,994,406

Table 343.—Producers' Sales of Cement in Canada, by Provinces, 1942-1944

Province	1942		1943		1944	
	Barrels	Value (*)	Barrels	Value (*)	Barrels	Value (*)
		\$		\$		\$
Quebec.....	4,446,416	6,487,078	3,394,895	4,899,578	3,249,302	4,736,004
Ontario.....	2,784,782	3,998,294	1,972,009	2,872,732	1,863,210	2,730,381
Manitoba.....	654,855	1,374,498	793,913	1,503,416	865,756	1,698,567
Alberta.....	668,043	1,307,353	606,703	1,176,442	699,989	1,370,502
British Columbia.....	571,945	1,198,014	534,769	1,146,865	512,594	1,085,918
Canada.....	9,126,041	14,365,237	7,302,289	11,599,033	7,190,851	11,621,372

(*) Less value of containers.

Table 344.—Number and Capacity of Kilns in Canadian Cement Plants, 1933-1944

Year	Total kilns		Kilns in use during the year	
	Number	Total capacity barrels per 24 hours	Number	Total capacity barrels per 24 hours
1933.....	41	43,622	(*)	(*)
1934.....	41	43,722	(*)	(*)
1935.....	20	32,650	(*)	(*)
1936.....	19	33,000	(*)	(*)
1937.....	18	33,900	(*)	(*)
1938.....	21	35,200	10	23,100
1939.....	21	35,000	11	23,700
1940.....	21	35,000	13	27,950
1941.....	20	33,050	16	30,350
1942.....	19	34,650	17	32,450
1943.....	19	33,750	15	30,296
1944.....	19	33,250	15	30,150

(*) Data not recorded.

Table 345.—Specified Materials Used in Canadian Cement Plants, 1933-1944

Year	Shale	Limestone	Gypsum	Silica sand	Clay	Iron oxides (†)
	Tons	Tons	Tons	Tons	Tons	Tons
1933.....	(*)	616,364	13,319	(*)	(*)	(*)
1934.....	(*)	806,546	19,172	(*)	(*)	(*)
1935.....	(*)	818,443	21,611	5,047	94,043	(*)
1936.....	(*)	1,180,358	25,447	8,549	195,877	444
1937.....	(*)	1,465,168	33,691	9,231	143,421	22
1938.....	13,821	1,344,868	51,975	9,465	105,982	16
1939.....	27,241	1,379,858	81,492	7,942	144,152	170
1940.....	18,347	1,765,944	38,903	15,298	185,954	614
1941.....	26,837	2,086,781	49,061	16,110	188,202	2,094
1942.....	30,498	2,155,750	49,816	20,711	165,345	1,502
1943 (a).....	(b) 75,460	1,918,742	47,034	19,473	173,728	3,924
1944 (c).....	74,303	1,865,597	42,672	23,942		

(*) Data not recorded.

(†) Produced from iron pyrites by the chemical industry.

(a) Value of these materials purchased in 1943 totalled \$403,289.

(b) Prior to 1943 shale consumed in British Columbia plants was included with limestone.

(c) Value of these materials purchased in 1944 totalled \$358,542.

Table 346.—Coal Used in Canadian Cement Plants, 1933-1944

Year	Canadian		Foreign	
	Tons	\$	Tons	\$
1933.....	48,905	236,947	46,955	229,399
1934.....	69,853	367,880	60,877	330,432
1935.....	78,477	433,347	53,338	291,741
1936.....	119,903	635,631	66,460	367,740
1937.....	145,791	760,766	90,925	513,417
1938.....	127,812	656,187	89,172	499,182
1939.....	190,538	1,010,071	16,141	82,336
1940.....	185,325	1,108,287	85,885	513,224
1941.....	125,740	772,829	203,905	1,331,448
1942.....	156,544	1,003,490	192,105	1,305,383
1943.....	98,135	595,385	225,741	1,664,546
1944.....	108,292	731,706	219,802	1,634,690

Table 347.—Quantity and Value of Electricity Purchased by Canadian Cement Companies 1935-1944

Year	Kilowatt hours	\$ (*)	Year	Kilowatt hours	\$ (*)
1935.....	51,958,859	494,538	1940.....	126,737,622	690,266
1936.....	62,038,700	553,212	1941.....	151,845,680	748,631
1937.....	61,045,600	606,969	1942.....	154,502,140	771,092
1938.....	59,705,200	583,858	1943.....	150,929,220	783,806
1939.....	105,938,210	589,190	1944.....	137,259,162	786,765

(*) Includes service charges.

Table 348.—Principal Statistics of the Cement Manufacturing Industry in Canada, 1942-1944

	1942	1943	1944
Number of firms.....	3	3	3
Number of plants.....	8	8	8
Capital employed.....	51,121,894	50,438,932	(b)
Number of employees—On salary.....	89	91	92
On wages.....	1,152	1,118	1,115
Total.....	1,241	1,209	1,207
Salaries and wages—Salaries.....	200,779	215,137	229,490
Wages.....	1,858,558	1,939,081	2,025,285
Total.....	2,059,337	2,154,218	2,254,775
Selling value of products (Gross).....	15,628,403	12,709,852	12,646,741
Cost of fuel and electricity.....	3,127,264	3,089,380	3,197,955
Cost of process supplies (a).....	1,024,057	1,356,890	1,541,063
Value of containers.....	1,263,166	1,110,819	1,025,369
Net value of products sold.....	10,213,916	7,152,763	6,882,354

(a) Other than fuel and electricity.

(b) Not recorded in 1944.

Table 349.—Wage Earners on the Last Day of Each Month, or Nearest Representative Date, 1940-1944

Month	1940	1941	1942	1943	1944		
					Quarry Male	Mill Male	Female
January.....	736	1,051	1,078	1,098	136	903	12
February.....	711	1,058	1,092	1,113	138	915	11
March.....	795	1,084	1,111	1,113	139	930	11
April.....	974	1,169	1,148	1,110	140	940	43
May.....	1,021	1,177	1,141	1,068	157	917	64
June.....	1,041	1,219	1,182	1,145	141	896	69
July.....	1,046	1,221	1,212	1,165	162	941	73
August.....	1,052	1,177	1,193	1,175	151	936	75
September.....	1,111	1,197	1,188	1,147	157	895	66
October.....	1,146	1,158	1,149	1,126	161	911	65
November.....	1,100	1,145	1,175	1,089	145	927	59
December.....	923	1,124	1,128	1,059	136	908	45

THE CLAY AND CLAY PRODUCTS INDUSTRY

The industrial clays of Canada may be classified as common clays, stoneware clays, fireclays, and china clays. Statistically, the ceramic industry of Canada is conveniently classified into two divisions: (1) Production from domestic clays, which includes the production of building brick, structural tile, drain tile, roofing tile, stoneware, sewer pipe, pottery and refractories, and (2) production from imported clays, which includes the manufacture of electrical porcelains, sanitary ware, sewer pipe, table ware, pottery, ceramic floor and wall tile, and various kinds of fireclay refractories. Data relating to the production of glass, cement and artificial abrasives are contained in separate reports.

A total of 134 plants operated in the domestic and imported clay products industries in Canada during 1944. These two industries provided employment for 3,488 persons during the year; their earnings totalled \$4,996,111. The combined production in 1944 was valued at \$11,421,990 compared with \$10,993,609 in 1943.

1. PRODUCTION FROM DOMESTIC CLAYS

The gross value of Canadian producers' sales of domestic clays and products made from same totalled \$6,997,425 in 1944 compared with \$6,608,193 in 1943, and \$13,904,643—the all-time high record established in 1929. Commercial production of domestic clay products in 1944 was reported from every province except Prince Edward Island; no output of these materials has as yet been officially recorded for the Yukon and Northwest Territories. Of the total value of sales in 1944, Ontario, Quebec and Alberta firms contributed \$2,347,396, \$1,881,791 and \$1,143,577 respectively.

The number of firms reported as active in the Canadian domestic clay products industry during 1944 totalled 106; of these, 53 were located in Ontario, 14 in Quebec, 10 in Alberta, 11 in British Columbia and the remainder in Nova Scotia, New Brunswick, Manitoba and Saskatchewan. The industry provided employment for 2,247 persons and distributed \$3,176,804 in salaries and wages. Fuel and electricity used in 1944 totalled \$1,357,313 and chemicals and various other process supplies consumed were valued at \$161,189.

Sales of building brick in 1944 totalled 154,785 M valued at \$3,155,380 compared with 138,678 M at \$2,808,764 in 1943. Sewer pipe shipments in 1944 amounted to \$964,732; hollow blocks and floor tile \$855,375; drain tile \$425,725; pottery, including earthenware, \$838,544; bentonite \$163,848, and fireclay, firebrick and fireclay blocks \$424,521.

Imports into Canada of clay and various clay products in 1944 were appraised at \$12,636,557 compared with \$13,446,817 in 1943. The value of clay products exported from Canada in 1944 was \$525,852 as against \$368,010 in the preceding year.

The following information is from a report "Clays and Clay Products, 1944" as prepared by the Bureau of Mines, Ottawa:

"Common clays suitable for the production of building brick and tile are found in all the provinces of Canada.

"The largest production in Canada of stoneware clay or semi-fireclays comes from the Eastend and Willows area, Saskatchewan. Large quantities of the clays from the area are selectively mined and are shipped to Medicine Hat, Alberta, where, owing to the availability of cheap gas fuel, they are used extensively in the manufacture of stoneware, sewer pipe, pottery, tableware, etc.

"Stoneware clays and moderately refractory fireclays occur near Shubenacadie and Musquodoboit, Nova Scotia. Some of the Musquodoboit clay is used for the production of pottery, but it has not been extensively developed for ceramic use.

"Stoneware clays or low-grade fireclays occur near Williams Lake and Chimney Creek Bridge in British Columbia; in the Cypress Hills of Alberta; and near Swan River, Manitoba; but they are difficult of access and have not been developed.

"Two large plants and a few small plants manufacture fireclay refractories from domestic clay. At one plant, about 50 miles south of Vancouver, firebrick and other refractory materials are manufactured from a high-grade moderately plastic fireclay that is extracted by underground mining from the clay beds in Sumas Mountain. Another plant at Claybank, Saskatchewan, utilizes the highly plastic refractory clays obtained by selective mining of the "White Mud" beds in the southern part of the province.

"A small amount of the most refractory clays in the deposits near Shubenacadie is mined and used by the steel plant at Sydney, Nova Scotia, for refractory purposes and some of the Musquodoboit clay is used for stove linings. Almost all other manufacturers of fireclay refractories (including high-temperature cements, plastic refractories, etc.) use imported clay.

"China clay (kaolin) has been produced commercially in Canada only from the vicinity of St. Remi d'Amherst, Papineau county, Quebec, where mining operations were carried on for several years prior to 1923. The large-scale operation of this deposit has been under consideration for a number of years and a company was organized a few years ago to extract the kaolinized material by underground mining, to refine it into high-grade china clay, and to recover washed silica sand as a by-product. Following its reorganization as Canada China Clay and Silica Products, Limited, the company constructed a modern plant equipped to carry out the washing process in accordance with the most up-to-date and scientific methods. The plant has been producing glass sand regularly. Canadian Kaolin-Silica Products' property at Lac Remi, Quebec, which was operated chiefly for the production of high-grade silica sand, has been idle since the destruction of the plant by fire a few years ago.

"Several other deposits of kaolin have been discovered in Quebec in recent years, among these being a deposit at Thirtyone Mile Lake, near Point Comfort, Hull county; near Brebeuf; at Lake Labelle; and near Chateau Richer.

"Important deposits of high-grade, plastic, white-burning, and buff-burning clays occur on the Mattagami, Abitibi, and Missinaibi Rivers in northern Ontario. Some of these can be classed as china clays, others as fireclays, and still others as ball clays. The deposits have attracted considerable interest in recent years, but efforts to develop them have been handicapped owing to the distance of the deposits from industrial centres, and to the lack of transportation facilities.

"In British Columbia, along the Fraser River, about 25 miles above Prince George, is an extensive clay deposit, parts of which yield a high grade of china clay. As china clay from England is difficult to obtain on the West coast, owing to shipping risks, consideration has been given to the possibility of using material from this deposit as a source of china clay suitable for the pulp and paper trade.

"In the manufacture of porcelain, sanitary ware, dinner ware, ceramic floor and wall tile, etc., china clay and ball clay from England or the United States is used. Separate production figures are not published for these classes of ceramic ware as there are only one or two producers in each case. Canada also imports large quantities of China clay for use in the production of paper; in the rubber industry; and for other industrial purposes.

"Ball clays of high bond strength occur in the "White Mud" beds of southern Saskatchewan, but they have not been developed to any extent.

"Activated clays for oil bleaching are largely imported. The value of such clays imported into Canada by oil refineries in 1944 was \$366,719, compared with \$295,066 in 1943. Fuller's and infusorial earths are also imported for use in sugar refineries, vegetable oil mills, etc. It has been reported that certain western bentonitic materials have been used in Canada for oil bleaching purposes."

Table 350.—Production (Total Sales) of Clay Products From Domestic Clays, 1935-1944

Year	\$	Year	\$
1935.....	3,012,563	1940.....	6,344,547
1936.....	3,471,027	1941.....	7,575,336
1937.....	4,516,859	1942.....	7,081,723
1938.....	4,536,084	1943.....	6,608,193
1939.....	5,151,236	1944.....	6,997,425

Table 351.—Production (Total Sales) of Clay Products, by Provinces, 1939-1944
(Gross Values)

Province	1939	1940	1941	1942	1943	1944
	\$	\$	\$	\$	\$	\$
Nova Scotia.....	339,952	490,543	529,435	618,441	478,571	402,694
New Brunswick.....	129,985	171,745	193,643	246,041	216,446	207,051
Quebec.....	1,274,776	1,546,246	1,944,358	1,741,297	1,504,428	1,881,791
Ontario.....	2,346,638	2,508,540	3,087,616	2,549,486	2,453,829	2,347,396
Manitoba.....	78,892	102,906	84,817	80,890	132,382	197,383
Saskatchewan.....	148,774	164,828	224,897	271,325	348,725	330,907
Alberta.....	461,079	838,856	952,144	1,013,497	978,649	1,143,577
British Columbia.....	371,140	520,883	558,426	560,746	495,163	486,626
Canada.....	5,151,236	6,344,547	7,575,336	7,081,723	6,608,193	6,997,425

Table 352.—Production (Sales) of Domestic Clay and Clay Products in Canada,
1943 and 1944

Product	Unit of measure	Sales or shipments			
		1943		1944	
		Quantity	\$	Quantity	\$
Clay —Bentonite.....	ton	(*)	117,047	(*)	163,848
Fireclay.....	ton	5,653	42,122	7,630	38,433
Kaolin.....	ton	93	1,531	424	5,758
Other clay.....	ton	20,638	101,036	18,801	92,602
Fireclay blocks and shapes.....			256,655		221,251
Firebrick.....	M	3,644	182,618	3,180	164,837
Brick—Soft mud process—Face.....	M	9,260	206,826	7,917	177,650
Common.....	M	14,195	209,508	14,182	214,336
Stiff mud process—Face.....	M	34,623	867,630	55,175	1,360,083
(wire cut) Common.....	M	51,000	829,365	44,451	742,437
Brick—Dry press—Face.....	M	10,504	256,362	13,990	337,715
Common.....	M	15,681	243,446	18,809	317,893
Fancy or ornamental brick (including special shapes, embossed and enamelled brick).....	M	3,190	191,424	28	866
Sewer brick.....	M	225	4,203	233	4,391
Paving brick.....	M	151	8,967	321	18,793
Structural tile —					
Hollow blocks (including fireproofing and load-bearing tile).....	ton	84,469	819,535	87,820	811,555
Roofing tile.....			26,949		43,817
Floor tile (quarries).....			390,377	13,684	425,725
Drain tile.....	M	13,001	1,116,846		964,732
Sewer pipe (including copings, flue linings, conduits, etc.).....					
Pottery, glazed or unglazed (including coarse earthenware, sanitary ware, stoneware, flower pots, and all other pottery).....			701,144		838,544
Other products.....			23,775		52,147
Total.....			6,608,193		6,997,425

(*) Not published.

In addition to the clays recorded in the above table, there were 165,345 tons of ordinary clay consumed in Canada during 1943 in the production of Portland cement; the corresponding consumption in 1944 was 173,728 tons. Also consumed by the Canadian cement industry in 1944 were 74,303 tons of shale.

Table 353.—Production of Building Brick in Canada, 1935-1944

	Soft mud process		Stiff mud process (wire cut)		Dry process		Fancy or orna- mental brick	Sewer brick	Total	Average value per M (a)
	Face	Common	Face	Common	Face	Common				
1935.....M	6,695	21,197	25,289	32,334	8,454	6,381	13	175	100,538	\$
.....M	122,215	259,504	500,066	437,123	175,042	55,253	728	5,236	1,555,167	15.47
1936.....M	6,097	24,180	30,218	35,592	8,961	10,241	25	418	115,732	
.....M	111,378	302,690	575,765	484,078	165,924	100,785	1,374	6,778	1,748,772	15.11
1937.....M	9,904	23,636	37,610	55,689	12,565	14,136	55	175	153,770	
.....M	175,544	316,534	735,615	755,630	233,542	152,662	2,972	2,777	2,375,276	15.45
1938.....M	10,838	24,104	34,179	50,734	13,125	15,536	63	228	148,807	
.....M	208,610	313,082	671,471	681,744	266,039	192,741	4,175	3,581	2,341,443	15.73
1939.....M	10,927	26,652	45,993	51,114	12,263	17,790	68	217	165,024	
.....M	182,376	372,116	941,696	692,224	242,518	236,597	4,601	4,506	2,676,634	16.22
1940.....M	15,946	40,395	41,552	52,777	14,932	24,870	47	694	191,213	
.....M	323,634	611,750	903,636	738,416	333,717	351,335	2,477	12,222	3,277,187	17.14
1941.....M	14,288	30,664	52,419	69,750	15,621	25,449	36	644	208,871	
.....M	285,260	455,385	1,218,632	1,043,832	363,908	386,097	2,100	10,279	3,765,493	18.00
1942.....M	11,385	20,387	39,104	59,901	12,871	25,145	11	513	169,317	
.....M	233,251	325,762	872,287	893,488	278,701	404,730	676	9,480	3,018,375	17.83
1943.....M	9,260	14,195	34,623	51,000	10,504	15,681	3,190	225	138,678	
.....M	206,826	209,508	867,630	829,365	256,362	243,446	191,424	4,203	2,808,764	20.25
1944.....M	7,917	14,182	55,175	44,451	13,990	18,809	28	233	154,785	
.....M	177,659	214,336	1,360,083	742,437	337,715	317,893	866	4,391	3,155,380	20.38

(a) Based on shipments of all grades and the value per M should be interpreted as the value of pressed, common and other varieties 'en masse' and not the value of any one particular type of brick.

Table 354.—Production of Building Brick in Canada, Per Capita of Population, For Years Specified

Year	M per capita	Year	M per capita
1905.....	0-087	1937.....	0-014
1914.....	0-070	1938.....	0-013
1929.....	0-046	1939.....	0-015
1930.....	0-031	1940.....	0-017
1932.....	0-010	1941.....	0-018
1934.....	0-008	1942.....	0-014
1935.....	0-009	1943.....	0-012
1936.....	0-010	1944.....	0-013

Table 355.—Production (Sales) of Building Brick (*) in Canada, by Provinces, 1942-1944

Province	1942		1943		1944	
	M	\$	M	\$	M	\$
Nova Scotia.....	7,086	129,679	6,411	108,963	5,987	96,411
New Brunswick.....	7,580	146,335	6,856	121,359	6,407	109,983
Quebec.....	61,300	1,067,253	52,428	976,370	65,103	1,303,666
Ontario.....	69,960	1,359,817	56,389	1,381,796	56,654	1,323,651
Manitoba.....	2,753	42,090	1,546	21,954	1,566	37,115
Saskatchewan.....	494	6,494	296	5,358	536	9,230
Alberta.....	13,991	145,379	12,026	130,534	15,590	197,940
British Columbia.....	6,153	121,328	2,726	62,430	2,942	77,384
Canada.....	169,317	3,018,375	138,678	2,808,764	154,785	3,155,380
Average value per M.....		\$17.83		\$20.25		\$20.38

(*) Includes fancy and sewer brick.

Table 356.—Production of Paving Brick in Canada, 1935-1944

Year	Quantity	Value
	M	\$
1935.....	15	627
1936.....	116	3,149
1937.....	3	131
1938.....	1	34
1939.....	157	6,089
1940.....	19	819
1941.....	120	7,312
1942.....	153	9,353
1943.....	151	8,967
1944.....	321	18,793

Table 357.—Production of Sewer Pipe, Copings, Flue Linings, etc., in Canada, 1935-1944

Year	Value	Year	Value
	\$		\$
1935.....	481,559	1940.....	1,152,603
1936.....	588,485	1941.....	1,422,389
1937.....	790,210	1942.....	1,392,545
1938.....	778,107	1943.....	1,116,846
1939.....	813,208	1944.....	964,732

Table 358.—Production of Drain Tile in Canada, 1935-1944

Year	Quantity	Value	Year	Quantity	Value
	M	\$		M	\$
1935.....	7,124	205,336	1940.....	10,550	277,551
1936.....	8,148	214,549	1941.....	12,319	333,364
1937.....	11,391	298,970	1942.....	11,659	329,035
1938.....	12,862	322,774	1943.....	13,001	390,377
1939.....	14,361	353,973	1944.....	13,684	425,725

Table 359.—Value (†) of Drain Tile and Sewer Pipe Produced (Sales) in Canada From Domestic Clays, by Provinces, 1941-1944

Province	1941	1942	1943	1944
	\$	\$	\$	\$
Nova Scotia.....	336,450	351,053	233,757	165,106
New Brunswick.....	5,729 (*)	4,448	7,346	5,269
Quebec.....	210,390	230,128	209,832	206,338
Ontario.....	705,370	644,631	628,447	621,326
Manitoba.....				
Saskatchewan.....	(*) 400		5,625	3,400
Alberta.....	334,318	343,141	281,008	253,679
British Columbia.....	163,096	148,179	141,208	135,339
Canada	1,755,753	1,721,580	1,507,223	1,390,457

(†) Includes value of copings, flue linings, etc.

(*) Drain tile only.

Table 360.—Value (*) of Drain Tile and Sewer Pipe Produced in Canada For Years Specified

Year	Value	Year	Value	Year	Value
	\$		\$		\$
1914.....	1,470,839	1926.....	1,876,794	1937.....	1,089,180
1916.....	1,075,674	1928.....	2,379,698	1938.....	1,100,881
1918.....	1,199,114	1929.....	2,726,203	1939.....	1,167,181
1920.....	2,111,742	1931.....	1,837,213	1940.....	1,430,154
1922.....	2,173,733	1933.....	577,287	1941.....	1,755,753
1924.....	2,003,649	1935.....	686,895	1942.....	1,721,580

(*) Includes value of copings, flue linings, etc.

Table 361.—Production (Sales) of Fireclay Blocks and Shapes and Firebrick From Domestic Clays, by Provinces 1944

Province	Fireclay		Fireclay blocks and shapes	Firebrick	
	Short tons	\$	\$	M	\$
Nova Scotia.....	2,919	10,711	270	3	147
New Brunswick.....					
Ontario.....					
Saskatchewan.....	948	9,133	194,824		
British Columbia.....	3,763	18,589	26,157	3,177	164,690
Canada.....	7,630	38,433	221,251	3,180	164,837

Table 362.—Production (Sales) of Fireclay, Fireclay Blocks and Shapes, and Firebrick From Domestic Clay, 1935-1944

Year	Fireclay		Fireclay blocks and shapes	Firebrick	
	Short tons	\$	\$	M	\$
1935.....	2,272	15,574	71,344	1,817	90,149
1936.....	2,437	17,639	65,171	2,548	118,923
1937.....	4,123	26,081	75,431	2,950	142,827
1938.....	2,344	17,243	73,512	2,213	113,581
1939.....	3,785	22,504	95,256	2,331	119,346
1940.....	4,831	30,564	85,127	3,167	165,525
1941.....	4,431	35,475	190,497	3,643	183,897
1942.....	5,601	40,722	210,246	3,816	197,830
1943.....	5,653	42,122	256,655	3,644	192,618
1944.....	7,630	38,433	221,251	3,180	164,837

NOTE.—Firebrick and fireclay blocks and shapes are made also from imported clays; see Table 377.

Table 363.—Production of Structural Tile in Canada, by Provinces, 1944

Province	Hollow blocks (*)		Roofing tile	Floor tile (Quarries)	
	Short tons	\$	\$	Sq. ft.	\$
Nova Scotia.....	13,139	119,595			
New Brunswick.....	1,668	14,071			
Quebec.....	31,285	283,329			
Ontario.....	28,344	271,977		212,805	43,817
Manitoba.....					
Saskatchewan.....	2,829	23,503			
Alberta.....	8,157	72,556			
British Columbia.....	2,395	26,527			
Canada.....	87,820	811,558		212,805	43,817

(*) Including fireproofing and load-bearing tile.

Table 364.—Production of Structural Tile in Canada, 1935-1944

Year	Hollow blocks (*)		Roofing tile		Floor tile (Quarries)	
	Short tons	\$	Number	\$	Sq. ft.	\$
1935.....	(†) 47,195	344,608	82,015	3,669	51,765	7,629
1936.....	58,501	467,860	52,730	2,139	97,738	13,798
1937.....	64,526	533,843	60,542	3,302	73,191	12,169
1938.....	70,648	591,416	150,504	5,196	100,958	15,330
1939.....	86,120	714,291	148,291	4,964	90,812	15,233
1940.....	105,073	788,478	41,772	1,839		13,631
1941.....	117,530	1,063,120		750		21,349
1942.....	109,905	1,082,573		32		23,705
1943.....	84,469	819,535		827		26,949
1944.....	87,820	811,558			212,805	43,817

(*) Including fireproofing and load-bearing tile.

(†) In addition, there was produced \$615 worth of ceramic tile.

Table 365.—Production (Sales) of Pottery From Domestic Clays For Years Specified

Year	Value	Year	Value
	\$		\$
1888.....	27,750	1931.....	257,125
1898.....	214,675	1932.....	244,861
1908.....	200,541	1933.....	202,500
1913.....	53,533	1934.....	223,733
1918.....	130,242	1935.....	220,711
1924.....	238,242	1936.....	218,402
1925.....	267,255	1937.....	232,209
1926.....	320,135	1938.....	235,890
1927.....	307,057	1939.....	(*) 282,712
1928.....	356,093	1940.....	474,452
1929.....	323,194	1941.....	502,212
1930.....	294,866		

(*) Includes value of sanitaryware.

Table 366.—Production (Sales) of Pottery From Domestic Clays, by Provinces, 1942, 1943 and 1944

Province	1942	1943	1944
	\$	\$	\$
New Brunswick.....	51,699	68,058	75,288
Quebec.....	39,400	54,391	82,000
Ontario.....	75,700	63,600	60,000
Alberta.....	476,183	512,178	617,326
British Columbia.....	3,106	2,917	3,930
Canada.....	646,088	701,144	838,544

Table 367.—Production (Sales) of Bentonite and Kaolin in Canada, by Provinces, 1935-1944

Year	Bentonite								Kaolin (a)	
	Manitoba		Alberta		British Columbia		Canada		Tons	\$
	Tons	\$	Tons	\$	Tons	\$	Tons	\$		
1935.....					41	781	41	781	170	1,520
1936.....					(b) 120	180	(b) 120	180		
1937.....	132	1,154			31	817	163	1,971		
1938.....			1,136	3,444	43	215	1,179	3,659		
1939.....	99	591	889	2,850			988	3,441		
1940.....	710	2,023	714	2,240	45	225	1,469	4,488		
1941.....	760	1,330	1,317	5,882	95	618	2,172	7,830	2	30
1942.....	660	38,800	956	5,404			1,616	44,204	408	6,130
1943.....		110,428		5,262		1,357	(c)	117,047	93	1,531
1944.....		160,268		2,076		1,504	(c)	163,848	424	5,758

(a) All from Quebec.

(b) Partly for experimental purposes.

(c) Quantity not available for publication.

BENTONITE IN 1944

(Bureau of Mines, Ottawa)

Bentonite, a type of clay derived from volcanic ash, is widely distributed in the Prairie Provinces, and occurs also in British Columbia. It has been produced intermittently on a small scale since around 1926, total output to the end of 1944 being estimated at about 15,000 tons. Of this, 48 per cent came from Manitoba, 46 per cent from Alberta, and 6 per cent from British Columbia. Small trial lots, not shown in statistical records, have also been produced in Saskatchewan.

Bentonites from different localities may vary rather widely in their nature and physical properties, and these determine the particular industrial uses of the material. Most Canadian bentonites are of the highly colloidal, swelling type, suitable for foundry use and for oil-well drilling. Manitoba, however, possesses deposits of non-swelling material that is of value for bleaching purposes in the natural state as well as being amenable to activation. It is also well suited for foundry use.

BENTONITE IN 1944 (Continued)

(Bureau of Mines, Ottawa)

Manitoba became the leading Canadian producer of bentonite in 1943 and retained that position in 1944, in which year it was the source of 85 per cent of the output. Twelve per cent of the 1944 production came from Alberta, and the remainder from British Columbia.

In Alberta, most of the production has come from Drumheller, in the Red Deer Valley area, where Gordon L. Kidd has been conducting operations since 1937. Aetna Coal Company, East Coulee, in the same region, also produces a small tonnage from its coal-mining operations. In southern Saskatchewan there are numerous occurrences of bentonite in the Willowbunch-St. Victor-Eastend region. Small trial shipments have been made from some of these, but so far there has been little active development. In southern British Columbia, bentonite occurs in beds up to 8 feet in thickness near Merritt and Princeton. Occasional small shipments have been made from the Princeton deposit, most of which have gone to Vancouver for grinding and local use.

Production of bentonite in Canada in 1944, including natural crude clay and activated material shipped by primary producers, was valued at \$163,848 compared with \$117,047 in 1943. Shipments totalled approximately 3,500 tons.

Manitoba's production, most of which was activated material, was valued at \$160,268 in 1944, compared with \$110,428 in 1943, and represented 98 per cent of the total value of output.

Bentonite is used chiefly as a bonding ingredient in foundry sands; for the bleaching, or decolorizing and filtering of mineral and vegetable oils and packing house products; and to control the viscosity of oil-well drilling muds. These three uses accounted for 85 per cent of the 480,000 tons produced in the United States in 1943, distribution being as follows: foundries, 38 per cent; bleaching, 33 per cent; drilling, 14 per cent. Most of the output of Pembina Mountain Clays, Limited, Winnipeg, is used in bleaching petroleum products, though sales are also made to linseed oil plants, packing houses, and to firms engaged in reclaiming crankcase oil.

The colloidal, or swelling type of bentonite has a wide range of minor uses, including fillers, concrete admixture, and for preventing seepage around dams, irrigation ditches, reservoirs, and structural foundations. It is used as an emulsifying agent in asphaltic and resinous compounds; in soaps and detergents; in various cosmetic and pharmaceutical preparations; as a suspending, spreading, and adhesive agent in horticultural sprays and insecticides; as a plasticizing ingredient in ceramic bodies, slips and glazes, and in plasters; to improve the flow and workability of concrete; in cement manufacture; and in the clarifying of wines, vinegar, etc.

The estimated consumption of bentonite in Canada in 1943, including both domestic and imported natural and activated material, totalled about 12,270 tons. Distribution, by industries, was as follows: bleaching of lubricating oils and gasoline, 49 per cent; steel, iron, and brass foundries, 39 per cent; polishes and cleansers, 7 per cent; pulp and paper, 2 per cent; miscellaneous, 3 per cent. In addition, 1,078 tons of crude bentonite were purchased from producers in Alberta for use in oil-well drilling in Turner Valley, making a total indicated consumption of 13,348 tons.

Prices in 1944 remained substantially unchanged. Wyoming standard 200-mesh bentonite, bagged, sold at \$9.50 per ton, f.o.b. plant, and crushed at \$7, in bulk. Special grades were quoted at \$11 to \$16.50. In 1943, the average unit value of production in the United States was \$6.24 per ton, and \$8.73 for the Wyoming field. Canadian trade journal quotations in 1944 for standard Wyoming-type clay were \$27 to \$30.

Alberta drilling bentonite was priced at \$38 per ton, bagged, f.o.b. Calgary, and \$40 in Turner Valley; in December, the price was reduced to \$35, ex-Turner Valley. Crude sold at around \$5 per ton, f.o.b. mine. Activated bentonite, for bleaching use, cost \$66 to \$68 per ton, in carload lots, delivered eastern Canadian points.

Table 368.—Fuller's Earth Used in Canada in the Manufacture of Soaps and Washing Compounds and in the Petroleum Products Industry, 1932-1944

Year	Petroleum Products Industry		Soaps and Washing Compounds	
	Pounds (*)	\$	Pounds	\$
1932.....	19,642,179	258,934	507,807	7,444
1933.....	22,811,655	314,515	588,434	8,501
1934.....	18,588,514	230,357	508,316	6,562
1935.....	18,487,148	260,885	660,018	13,694
1936.....	18,907,295	243,164	1,328,219	20,601
1937.....	18,843,458	240,309	1,167,768	20,393
1938.....	19,687,467	281,668	1,195,208	19,575
1939.....	19,814,473	304,214	1,586,163	30,624
1940.....	23,828,660	406,185	1,651,471	40,695
1941.....	30,155,750	571,010	1,486,000	39,332
1942.....	24,162,091	528,350	1,350,000	37,831
1943.....	25,390,653	601,283	2,410,000	83,233
1944.....	27,569,500	646,708	1,181,020	35,047

(*) Includes all clays.

Table 369.—China Clay (Kaolin) Used in the Manufacture of Paper in Canada, 1931-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1931.....	11,484	173,660	1938.....	34,968	488,147
1932.....	14,432	205,068	1939.....	32,769	430,092
1933.....	20,048	267,014	1940.....	36,931	558,659
1934.....	27,550	357,286	1941.....	32,844	588,585
1935.....	33,766	422,584	1942.....	28,734	578,190
1936.....	39,165	520,121	1943.....	26,374	561,285
1937.....	41,738	578,223	1944.....	47,995	987,488

Table 370.—Clays and Earths Used in Canadian Rubber Goods Industry, 1934-1944

Year	Tons	Value	Year	Tons	Value
		\$			\$
1934.....	2,391	54,368	1939.....	3,438	80,745
1935.....	2,639	63,553	1940.....	3,586	90,867
1936.....	3,017	70,709	1941.....	4,059	101,441
1937.....	3,614	79,300	1942.....	1,523	37,186
1938.....	2,942	81,935	1943.....	1,257	35,266
			1944.....	1,909	51,942

Table 371.—Firebrick and Fireclay Used in the Manufacture of Iron and Steel and Their Products in Canada, 1932-1944

Year	Cost at works	Year	Cost at works
	\$		\$
1932.....	212,419	1939.....	939,495
1933.....	216,014	1940.....	1,597,898
1934.....	289,932	1941.....	2,581,813
1935.....	581,269	1942.....	3,268,181
1936.....	779,014	1943.....	3,717,826
1937.....	1,058,787	1944.....	3,268,941
1938.....	838,012		

Table 372.—Production (Sales) in Canada of Clay Products made from Domestic Clays, by Months, 1944 and 1945

Month	Building brick		Structural tile		Drain tile		Sewer pipe	Fireclay blocks and shapes	Pottery (b)	Other clay products (c)	Total
	M	\$	Ton	\$	M						
					\$	\$					
1944 (a)											
January.....	8,038	141,407	4,395	43,711	554	15,942	27,383	27,560	68,525	38,010	362,538
February.....	6,355	114,464	3,556	36,329	536	16,180	24,610	21,053	71,006	38,579	322,221
March.....	8,071	153,791	3,610	34,948	591	17,104	38,972	20,566	74,803	39,594	380,078
April.....	9,442	174,008	4,480	43,900	501	16,088	57,780	12,352	69,391	24,140	397,659
May.....	13,995	263,375	6,487	62,119	1,257	38,238	118,758	15,178	71,187	31,731	600,566
June.....	14,709	281,553	8,983	85,916	1,319	41,455	114,676	23,276	70,388	41,052	658,266
July.....	16,306	324,799	9,348	94,457	1,561	51,250	125,684	14,183	64,251	41,173	715,797
August.....	17,094	343,029	8,982	87,384	1,586	49,957	117,385	18,136	70,997	46,497	733,395
September.....	17,419	354,672	9,011	90,796	1,671	50,357	103,309	19,693	72,517	36,810	720,400
October.....	17,519	361,712	9,497	92,551	1,764	54,550	98,049	20,452	72,701	41,563	740,819
November.....	16,338	344,910	8,602	86,462	1,595	49,539	90,364	16,957	68,135	40,765	697,232
December.....	9,449	191,229	4,268	44,246	554	17,395	49,639	20,452	74,441	33,536	431,238
Total.....	155,335	3,048,949	81,219	802,829	13,459	418,115	966,009	223,375	846,342	451,650	6,760,269
1945											
January.....	8,154	183,380	5,377	52,023	149	5,938	47,126	20,243	69,768	29,648	408,135
February.....	10,372	198,534	3,590	37,049	171	5,906	31,001	17,860	74,151	33,530	398,724
March.....	12,697	250,460	6,624	69,632	650	20,256	64,317	20,860	74,151	38,955	547,681
April.....	12,697	250,460	6,704	68,345	744	25,718	109,432	13,166	66,135	38,932	572,714
May.....	13,799	302,807	8,208	92,878	1,108	38,901	113,541	16,000	76,201	41,330	681,458
June.....	15,188	325,007	8,523	92,040	1,434	47,777	110,353	25,251	71,658	46,208	738,294
July.....	18,066	398,067	8,947	94,913	1,332	47,777	126,325	25,410	40,131	43,250	774,773
August.....	18,241	413,405	8,800	95,289	1,522	56,535	112,639	21,120	69,933	45,431	814,502
September.....	19,226	436,678	9,644	102,000	1,448	56,283	96,639	25,500	62,276	49,948	829,324
October.....	21,170	485,364	11,131	119,697	1,622	61,939	121,025	17,394	90,139	57,483	953,041
November.....	19,322	445,339	9,443	99,665	1,532	56,517	123,632	23,015	104,458	53,070	905,696
December.....	14,983	348,725	6,387	69,140	794	30,705	87,546	14,919	86,471	43,157	680,753
Total.....	183,915	4,076,801	93,192	992,714	12,506	454,142	1,134,866	230,758	895,062	529,932	8,305,295

(a) Data not revised to agree with statistics shown elsewhere in this report.

(b) Includes flower pots, stoneware, artware, etc.

(c) Includes floor tile, firebrick, etc.

Table 373.—Principal Statistics of the Domestic Clay Products Industry in Canada, 1943 and 1944

	1943	1944	1944
	Entire industry	Entire industry	Stoneware and pottery only
Number of plants.....	105	110	8
Capital employed..... \$	17,162,747	(†)	(†)
Number of employees—On salary.....	248	253	12
On wages.....	1,925	1,994	346
Total.....	2,173	2,247	358
Salaries and wages—Salaries..... \$	570,300	594,282	24,948
Wages.....	2,339,541	2,582,522	331,944
Total..... \$	2,909,841	3,176,804	356,892
Selling value of products (gross)..... \$	6,608,193	6,997,425	834,614
Cost of fuel and purchased electricity.....	1,157,471	1,357,313	33,402
Cost of process supplies.....	104,336	161,189	33,414
Net value of sales.....	5,346,386	5,478,923	767,798

(†) Data not collected in 1944.

Table 374.—Employees, Salaries and Wages in the Clay Products Industry in Canada, by Provinces, 1943

Province	(*) Average number of employees					Salaries and wages		
	Salaried employees		Wage-earners		Total	Salaries	Wages	Total
	Male	Female	Male	Female				
						\$	\$	\$
Nova Scotia.....	10	4	129	1	144	39,920	144,226	184,146
New Brunswick.....	3		27		30	5,185	40,561	45,746
Quebec.....	47	10	476	23	556	129,636	712,960	842,596
Ontario.....	76	28	596	16	716	251,550	870,502	1,122,052
Manitoba.....	7	3	65	4	79	16,000	65,787	81,787
Saskatchewan.....	9		34		43	23,679	61,007	84,686
Alberta.....	29	9	314	164	516	86,519	466,169	552,688
British Columbia.....	14	4	145		163	41,793	221,310	263,103
Canada.....	195	58	1,786	208	2,247	594,282	2,582,522	3,176,804
INDUSTRY								
Brick and tile.....	189	52	1,622	26	1,889	569,334	2,250,578	2,819,912
Stoneware and pottery.....	6	6	164	182	358	24,948	331,944	356,892
Canada.....	195	58	1,786	208	2,247	594,282	2,582,522	3,176,804

(*) See note page 35.

Table 375.—Average Number of Wage-Earners, by Months, 1940-1944

Month	1940	1941	1942	1943	1944		
					Pit	Plant	
						Male	Female
January.....	1,190	1,907	1,966	1,692	91	1,427	183
February.....	1,051	1,792	1,811	1,663	88	1,405	198
March.....	1,287	1,871	1,829	1,708	88	1,455	196
April.....	1,739	2,427	2,106	1,750	101	1,587	197
May.....	2,647	3,250	2,382	1,898	146	1,761	200
June.....	3,143	3,369	2,570	2,072	153	1,827	214
July.....	3,191	3,281	2,588	2,167	161	1,843	217
August.....	3,027	3,070	2,560	2,169	172	1,748	215
September.....	2,812	2,869	2,389	2,101	163	1,735	212
October.....	2,530	2,628	2,326	2,021	153	1,732	208
November.....	2,300	2,424	2,218	1,909	134	1,654	211
December.....	2,151	2,153	1,920	1,830	102	1,588	210

Table 376.—Average Amount of Weekly Wages Paid Per Capita in Brick and Tile Plants, 1939-1944 (*)

Year	Male	Year	Male
	\$		\$
1939.....	19.29	1942.....	23.47
1940.....	20.19	1943.....	25.40
1941.....	22.15	1944.....	31.25

(*) During one week in month of highest employment; including overtime, etc.

II. PRODUCTS FROM IMPORTED CLAYS

This industry covers the operations of Canadian plants which were occupied chiefly in making ceramic products from imported clays. Products made in these plants during 1944 included high tension insulators, vitreous china sanitary ware, china dinnerware, firebrick, sewer pipe, floor and wall tile, refractory cements, electrical porcelains, etc.

Twenty-four plants reported in this group for 1944 and their output was valued at \$4,424,565 against last year's total of \$4,385,416 and the 1942 figure of \$5,397,228. The average number of workers was 1,241 and payments for salaries and wages totalled \$1,819,307. Fuel and electricity cost \$310,155, and materials for use in manufacturing processes cost \$979,998.

Table 377.—Products Made in the Imported Clay Products Industry, 1943 and 1944

Product	1943	1944
	Gross selling value at works	Gross selling value at works
	\$	\$
Firebrick and stove linings—Rigid.....	608,482	496,914
Plastic.....	254,523	236,068
High temperature cements.....	112,737	102,908
High tension porcelain insulators, china sanitary ware, clay sewer pipe, floor and wall tile, pottery, china tableware, etc. (Separate figures cannot be shown for these items as there were only one or two producers in each case).....	3,409,674	3,588,675
Total.....	4,385,416	4,424,565

Table 378.—Materials Used in the Imported Clay Products Industry, 1943 and 1944

Material	1943		1944	
	Short tons	Total cost at works	Short tons	Total cost at works
		\$		\$
Imported clays—Ball clay.....	2,230	43,901	2,650	54,503
China clay.....	2,889	70,479	2,845	71,979
Fireclay.....	30,297	244,788	29,780	236,089
Sagger clay.....	812	13,828	669	12,220
Other imported clays.....	12	18,991	247	18,365
Canadian clays—Fireclay.....	18	300	40	840
Other clays.....	12	54	25	75
Feldspar.....	2,352	50,794	2,325	50,237
Silica and ground quartz.....	3,597	58,412	3,441	55,627
Talc.....	354	5,586	535	8,564
Other glazing materials.....		18,277		31,538
Insulator hardware.....		75,316		83,629
Shipping containers and packing materials.....		94,424		129,767
All other materials.....		234,704		226,565
Total.....		929,854		979,998

PRICES (a)

Bentonite.—per ton, carload lots, f.o.b. Wyoming mines, dried and crushed, in bulk, \$7.50; pulverized, 200 mesh, \$9.50 in 100-lb. paper bags.

China Clay (Kaolin).—per ton, f.o.b. South Carolina and Georgia mines, in bulk; sagger clays, \$2.50 to \$3.50; tailings, \$4.50 to \$5.00. No. 2 grades, \$5.50 to \$6.00; No. 1 grades, air-floated, crude, \$6.75 to \$8.00; No. 1 washed, \$8.00. Florida: washed, crushed, bulk, \$11.75; air-floated and washed, \$14 to \$15. Maryland: ball clays, shredded bulk, \$3.00 to \$7.00; air-floated, in paper bags, \$10.00 to \$18.25. New Jersey: Plastic kaolin, pulverized, in paper bags, \$10.25 to \$10.75. Insecticide clay, \$11.50 to \$16.50. Imported English, per long ton, C and F. American ports: lump, \$26 to \$28 in bulk; air-floated \$40 to \$60 nominal.

Fuller's Earth.—per ton, f.o.b. Colorado, \$9; f.o.b. Georgia or Florida, 30 to 60 mesh, \$14.50; 15 to 30, \$14; 200 and up, \$10; 100 and up, \$7.

(b)—**Fuller's Earth**.—English, long ton, nominal; Georgian, carlots, long ton \$27.78.

China Clay.—Imported, carlots, bulk, ton \$25 to \$50 (U.S. only). Pigment clay for rubber, carlots, bags, ton \$23.00 less carlots, ton, \$26.50. Kaolin, colloidal, lb. 10 cents, Osmo 14 cents a pound.

(a) "Engineering & Mining Journal's Metal & Mineral Markets"—New York.

(b) F.O.B. market at Toronto—"Canadian Chemistry & Process Industries"—Toronto, July, 1944 and June, 1943.

Table 379.—Imports Into Canada and Exports of Clay and Clay Products, 1943 and 1944

		1943		1944	
		Quantity	\$	Quantity	\$
IMPORTS					
Building brick.....	ton	1,192	17,403	3,972	47,968
Building blocks and fireproofing tile.....			22,354		22,802
Clays—China.....	cwt.	674,008	392,651	1,150,410	615,272
Fire.....	cwt.	1,668,888	320,809	1,524,626	289,581
Pipe.....	cwt.	211,750	25,248	99,000	11,521
Other clays, n.o.p.....			186,842		194,385
Zirconium silicate.....			15,146		16,302
Zirconium oxide.....			41,745		26,944
Drain tile, unglazed.....			1,417		
Drain, sewer pipe and earthenware fittings therefor, chimney linings or vents, chimney tops or inverted blocks, glazed or unglazed, n.o.p.....			2,958		12,027
Tiles or blocks of earthenware or stone prepared for mosaic flooring.....			23,680		64,904
Tiles, earthenware, for roofing purposes.....			254		4,522
Tiles, earthenware, n.o.p.....			56,638		181,264
Insulators, electric, porcelain.....			241,335		194,136
Pottery, chinaware and earthenware, n.o.p.....			4,371,530		4,789,478
Brick, fire, other, valued at not less than \$100 per M, rectangular shaped; the dimensions of each not to exceed 125 cubic inches; for use exclusively in the construction or repair of a furnace, kiln, etc.....			70,129		38,164
Brick, fire, n.o.p., for use exclusively in the construction or repair of a furnace, kiln or other equipment of a manufacturing establishment (not made in Canada).....			1,972,956		1,434,601
Firebrick, n.o.p.....			1,661,129		1,227,598
Firebrick, chrome.....			256,993		437,980
Magnesite brick (fire).....			1,111,754		718,481
Silica brick (containing not less than 90 per cent silica).....			847,456		713,538
Paving brick.....	ton	944	7,753	1,164	10,407
Artificial teeth, not mounted.....			768,425		814,014
Baths, bathtubs, basins, laundry tubs, etc., of earthenware, cement or clay, n.o.p.....			359,978		104,729
Saggars.....			46,778		17,133
Crucibles, clay or sand.....			21,799		25,385
Other manufactures of clay, n.o.p.....			259,697		207,530
Activated clay to refine oil.....			295,066		366,719
Grog for refractory materials.....	ton	2,070	46,894	2,448	49,165
Total			13,446,817		12,636,557
EXPORTS					
Building brick.....	M	1,711	30,305	1,955	36,652
Bricks, fire.....					157,107
Clay, manufactures of.....			221,104	(*)	39,373
Clays, unmanufactured.....	cwt.	1,871	4,059	48,621	14,114
Earthenware.....			31,181		61,931
Porcelain insulators.....			81,361		216,675
Total			368,010		525,852

(*) Included fire brick prior to 1944.

LIME INDUSTRY

Production of quick and hydrated lime in Canada during 1944 totalled 885,142 short tons valued at \$6,926,844 compared with the all-time high tonnage of 907,768 tons worth \$6,832,992 in 1943. Comprising the 1944 production were 738,202 tons of quicklime valued at \$5,948,079 and 146,940 tons of hydrated worth \$978,765. During the year under review 700,708 tons of quicklime valued at \$5,545,695 and 89,576 tons of hydrated lime valued at \$413,573 were sold or used by producers for chemical manufacture, while the balance of Canadian lime production was sold or used for building, agricultural and other purposes.

Stone used in the production of lime in Canada includes calcium, high calcium and dolomitic varieties of limestone. Included in the total figures of Canadian lime production is a considerable tonnage of lime recovered as a by-product in the manufacture of chemicals or allied products. It is estimated that approximately 1,571,451 tons of limestone were consumed in the production of lime in 1944. Lime was produced during 1944 in all Canadian provinces with the exception of Prince Edward Island and Saskatchewan; no commercial production of lime in the Territories has ever been officially reported. Of the total Canadian output of lime in 1944, Ontario plants produced 429,285 short tons or 48.5 per cent and Quebec 339,082 short tons or 38.3 per cent.

Imports of lime into Canada during 1944 totalled 6,698 short tons appraised at \$34,917 compared with 9,077 short tons at \$64,303 in 1943. Exports of lime from Canada in 1944 amounted to 15,451 short tons valued at \$136,797 as against 15,391 tons worth \$133,320 in the preceding year.

During 1944 the lime industry, comprising 38 firms, reported 42 plants as active and the distribution of \$1,414,426 in salaries and wages to 815 employees. The cost of fuel and purchased electricity used amounted to \$1,752,723 and the value of explosives, chemicals, drill steel and other process supplies consumed aggregated \$168,886.

A report on lime for 1944, as prepared by the Bureau of Mines, Ottawa, contains the following information:

"Lime is manufactured in every province except Prince Edward Island, though the production in Saskatchewan is intermittent and small. Both high-calcium and dolomitic limes are produced in Nova Scotia, New Brunswick, Ontario, and Manitoba, but only high-calcium lime is made in Quebec, Alberta, and British Columbia. Ontario, the leading producer, supplies nearly one-half of the total output, Quebec being next with about 42 per cent.

"There are many prospective lime-producing localities in Canada because of the abundance of limestone throughout the country; but in the more industrialized areas, particularly in Ontario and Quebec, large unworked deposits of pure high-calcium limestone that will yield a white lime suitable for chemical purposes are becoming scarce. With the northward development of the mining industry, interest is being manifested in making lime from limestone deposits in the more northerly parts of the country.

"The demand for lime by war industries raised production above all previous records in 1943, and the decrease in output in 1944 was caused mainly by labour and fuel shortages and by the difficulty of getting replacement parts. Prior to the war a program of modernization was under way at most of the larger lime plants and this program will be proceeded with at an accelerated pace as soon as equipment becomes available.

"Prices of the various lime products vary over a wide range, depending upon the geographical position of the plants and upon difference in quality of the lime. No significant change occurred in prices of lime during 1944.

"Lime is marketed in the form of quicklime and in the hydrated state, the latter being specially prepared slaked lime in the form of fine powder that is marketed in 50-pound, multi-wall paper bags. Quicklime is marketed in the lump, pebble, crushed, and pulverized forms. Lump lime and pebble lime are sold either in bulk or packed in barrels; crushed lime (1-inch

and under) and pulverized lime are sold in air-tight, multi-wall paper bags. In these various forms lime has many uses in chemical and metallurgical processes, in agriculture, in construction, and for various other purposes. It is one of the great basic raw materials of the chemical industry and over 90 per cent of the present production is used in chemical processes.

"The post war outlook for the lime industry, because of its close connection with the rapidly expanding chemical and metallurgical industries, appears to be bright. New chemical uses for lime are continually appearing, and the demand for mason's lime, which has been small in recent years, should increase with the resumption of peacetime building activities."

Table 380.—Production of Lime in Canada, by Provinces, 1944, Showing Purposes For Which Used (*) or Sold

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Total Canada
(1 ton=2,000 pounds)						
QUICKLIME						
Building trades—						
Finishing lime.....ton			111	3,328		3,439
\$			2,013	42,492		44,505
Masons' lime.....ton	160	4,961	11,426	552		17,099
\$	1,070	92,580	101,295	6,556		201,501
Sand-lime brick.....ton		1,892	3,319			5,211
\$		12,327	25,544			37,871
Agriculture.....ton		54	316			370
\$		810	2,375			3,185
CHEMICAL—						
Smelters (non-ferrous).....ton		13,745	4,079	1,800		19,624
\$		98,552	28,268	14,450		141,270
Iron and steel furnaces (†).....ton	5,194	3,655	26,589	700	2,538	38,676
\$	66,663	34,105	191,936	5,600	19,289	317,593
Cyanide and flotation mills.....ton		1,184	6,525	6,796	320	14,825
\$		8,586	48,376	64,078	2,432	123,472
Pulp and paper mills.....ton	13,228	99,790	8,756	11,353	26,420	159,547
\$	142,045	776,546	65,049	86,931	245,680	1,316,251
Glass works.....ton			14,680	52		14,732
\$			122,617	416		123,033
Sugar refineries.....ton	167	10	3,566	8,901	30	12,674
\$	2,161	225	40,811	73,830	228	117,255
Tanneries.....ton	4	1,229	3,294			4,527
\$	52	10,587	23,157			33,796
Fertilizer plants.....ton			319			319
\$			1,854			1,854
Insecticide plants.....ton			1,650		230	1,880
\$			7,551		1,748	9,299
Other chemical works.....ton	177	121,273	306,231	3,855	2,368	433,904
\$	2,302	1,101,910	2,218,823	20,840	17,997	3,361,872
Uses unspecified.....ton	1,650	2,823	817	1,193	4,892	11,375
\$	24,209	31,685	7,109	15,140	37,179	115,322
Total Quicklime.....ton	20,580	250,616	391,678	38,530	36,798	738,202
\$	238,502	2,167,913	2,886,778	330,333	324,553	5,948,079
HYDRATED LIME						
Building trades—						
Finishing lime.....ton		1,314	19,758	6,775		27,847
\$		15,032	245,898	104,234		365,164
Masons' lime.....ton	330	5,564	6,946			12,840
\$	4,105	17,679	68,047			89,831
Sand-lime brick.....ton						
\$						
Agriculture.....ton		4,869	2,295		6,657	13,821
\$		14,080	24,254		46,473	84,807

Table 380.—Production of Lime in Canada, by Provinces, 1944, Showing Purposes For Which Used (*) or Sold—Concluded

	Nova Scotia and New Brunswick	Quebec	Ontario	Manitoba and Alberta	British Columbia	Total Canada
(1 ton=2,000 pounds)						
HYDRATED LIME						
CHEMICAL—						
Smelters (non-ferrous).....ton	66,140	60	60	295	66,555	
Iron and steel furnaces.....ton	207,029	573	600	2,059	210,261	
Cyanide and flotation mills.....ton	74	768			74	
Pulp and paper mills.....ton	2,226	215	230	36	2,707	
Sugar refineries.....ton	5,435	2,308	2,300	251	10,294	
Tanneries.....ton	2,200	4,437	4,356	45	11,038	
Fertilizer plants.....ton	27,368	43,814	42,924	314	114,420	
Insecticide plants.....ton	47	95	3,026		3,168	
Other chemical works.....ton	585	973	21,372		22,930	
Uses unspecified.....ton	80	842			922	
Total Hydrated Lime.....ton	740	8,817			9,557	
Grand Total.....ton		680	5,612		680	
		2,546	377		2,923	
		238	54		292	
		2,546	377		2,923	
		3	1,729	125	4,140	
		44	17,286	1,250	36,808	
		14,097	4,424		25,390	
		1,458	414		2,856	
		80	842		922	
		740	8,817		9,557	
		680	5,612		680	
		2,546	377		2,923	
		238	54		292	
		2,546	377		2,923	
		3	1,729	125	4,140	
		44	17,286	1,250	36,808	
		14,097	4,424		25,390	
		1,458	414		2,856	
		80	842		922	
		740	8,817		9,557	
		680	5,612		680	
		2,546	377		2,923	
		238	54		292	
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		14,097	4,424		25,390	
		1,458	414		2,856	
		80	842		922	
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		238	54		292	
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		44	17,286	1,250	36,808	
		14,097	4,424		25,390	
		1,458	414		2,856	
		80	842		922	
		740	8,817		9,557	
		680	5,612		680	
		2,546	377		2,923	
		238	54		292	
		2,546	377		2,923	
		3	1,729	125	4,140	
		44	17,286	1,250	36,808	
		14,097	4,424		25,390	
		1,458	414		2,856	
		80	842		922	
		740	8,817		9,557	
		680	5,612		680	
		2,546	377		2,923	
		238	54		292	
		2,546	377		2,923	
		3	1,729	125	4,140	
		44	17,286	1,250	36,808	
		14,097	4,424			

Table 383.—Imports Into Canada and Exports of Lime and Various Lime Compounds, 1943 and 1944

	1943		1944	
	Quantity	Value	Quantity	Value
		\$		\$
IMPORTS				
Lime.....cwt.	(*) 181,543	64,303	(*) 133,956	34,917
Calcium chloride in packages of not less than 25 pounds.....lb.	592,700	9,782		
Calcium chloride in packages of less than 25 pounds.....lb.	1,282	463	(a) 7,207,500	77,274
Calcium chloride, not in solution, for road treating purposes.....lb.	9,709,400	101,071		
Calcium arsenate.....lb.	9,664	665		
Chloride of lime and hypochlorite of lime in packages not less than 25 pounds.....lb.	750,400	22,221		
Chloride of lime and hypochlorite of lime in packages of less than 25 pounds.....lb.	382	198	(b) 441,800	30,113
Calcium compounds, n.o.p.....lb.			1,475,903	120,763
EXPORTS				
Building lime.....cwt.	7,691	3,936	484	675
Lime, n.o.p.....cwt.	300,121	129,384	308,532	136,122
Acetate of lime.....cwt.	92,808	288,420	98,070	320,650
Calcium compounds, n.o.p.....cwt.	2,149,602	6,102,504	1,733,833	5,708,752

(*) All from the United States.

(a) Calcium chloride.

(b) Chloride of lime.

Table 384.—Principal Statistics of the Lime Industry in Canada, 1943 and 1944

	1943	1944
Number of firms.....	41	38
Number of plants.....	45	42
Capital employed.....\$	4,607,651	(*)
Number of employees—On salary.....	99	102
On wages.....	799	713
Total.....	898	815
Salaries and wages—Salaries.....\$	158,629	178,802
Wages.....\$	1,249,764	1,235,624
Total.....\$	1,408,393	1,414,426
Selling value of products (gross).....\$	6,832,992	7,051,785
Cost of fuel and electricity.....\$	1,747,012	1,752,723
Process supplies used.....\$	177,470	168,886
Selling value of products (net).....\$	4,908,510	5,005,235

(*) Data not collected.

Table 385.—Number of Firms, Employees, Salaries and Wages and Lime (Quick and Hydrated) Sold or Used, by Provinces, 1944

Province	Number of firms	Number of employees	Salaries and wages	Fuel electricity and process supplies used (†)	Production	
					Tons of lime, sold or used	Value (gross)
			\$	\$		\$
New Brunswick (*).....	4	91	142,793	93,310	23,160	277,242
Quebec.....	12	307	468,083	634,151	339,082	2,547,570
Ontario.....	12	210	432,577	984,401	429,285	3,379,127
Manitoba.....	4	85	110,733	135,501	29,894	307,993
Alberta.....	4	44	72,778	48,974	18,852	158,957
British Columbia.....	2	78	187,462	150,213	44,899	380,896
Canada.....	38	815	1,414,426	2,046,550	885,142	7,051,785

(*) Includes data relating to one firm in Nova Scotia.

(†) This item includes cost of containers as reported.

Table 386.—Number of Wage-Earners on Payroll or Time Record on the Last Day of Each Month or Nearest Work Day, 1942-1944

Month	1942		1943		1944			
	Quarry	Kiln	Quarry	Kiln	Quarry		Kiln	
					Male	Female	Male	Female
January.....	285	628	322	519	242	.....	469	.....
February.....	297	619	309	501	237	.....	486	.....
March.....	314	647	275	503	248	.....	498	.....
April.....	311	646	310	509	235	.....	498	.....
May.....	318	643	281	525	237	.....	486	.....
June.....	331	637	274	529	232	.....	477	.....
July.....	327	633	266	517	242	.....	468	.....
August.....	307	604	275	506	222	.....	447	.....
September.....	290	587	260	515	229	.....	453	.....
October.....	261	631	261	541	215	.....	491	.....
November.....	271	614	261	540	237	.....	486	.....
December.....	272	590	245	507	224	.....	432	.....

THE SAND-LIME BRICK INDUSTRY, 1944

Three plants in Canada were engaged chiefly in making sand-lime building brick during 1944. One of these was located in Ontario, 1 in Quebec and 1 in Manitoba. Production, including some building blocks and insulating brick, was valued at \$211,603, a slight decrease from the 1943 total of \$213,247.

An average of 46 people were employed in these works in 1944 and they were paid \$84,130 in salaries and wages. Expenditures for fuel and electricity amounted to \$20,729 and for processing materials to \$59,609.

Production of sand-lime brick amounted to 12,235 M valued at \$171,594, a gain in both quantity and value from the output of 9,088 M brick at \$123,263 in the previous year. Production of sand-lime building blocks increased to 235 M at \$35,662 from 139 M at \$22,365 in 1943.

Table 387.—Products Made, 1943 and 1944

		1943		1944	
		Quantity	Selling value at works	Quantity	Selling value at works
			\$		\$
Sand-lime brick.....	M	9,088	123,263	12,235	171,594
Sand-lime building blocks.....	M	139	22,365	235	35,662
Other products (*).....			67,614		4,347
Total.....			213,247		211,603

(*) Includes cement blocks, cinder blocks and insulating brick.

Table 388.—Materials Used in Manufacturing, 1943 and 1944

Material	Unit of measure	1943		1944	
		Quantity	Cost at works	Quantity	Cost at works
			\$		\$
Portland cement.....	brl..	4,482	8,678		
Quicklime.....	ton	2,441	20,435	2,864	26,297
Sand and gravel.....	cu. yd.	18,990	26,955	27,525	32,251
Cinders.....	cu. yd.	6,000	4,500		
Other materials.....			6,105		1,061
Total.....			66,673		59,609

SAND AND GRAVEL INDUSTRY

Commercial production of sand and gravel in Canada during 1944 totalled 28,399,986 short tons valued at \$10,280,119 compared with 25,744,469 short tons worth \$9,005,857 in 1943. Included in the totals for both years are sands and gravels from various sources, including recoveries by dredges and material used by railroads as ballast and by mines as backfill.

Quebec and Ontario are Canada's largest sand and gravel-producing provinces, the tonnage produced in these provinces in 1944 being, respectively, 8,541,400 and 9,529,803; in 1944 the quantity of material washed or screened at Canadian sand and gravel plants totalled 3,442,147 short tons as against 2,842,803 tons in 1943, and the quantity of bank or pit-run grades amounted to 24,957,839 short tons compared with 22,901,666 tons in the preceding year.

Of the total sand and gravel (mixed) output in 1944, there were 16,648,511 tons used for concrete, roads, etc., and 4,428,721 short tons as railroad ballast. In addition, there were produced 1,605,514 short tons of straight-run sand for building, concrete, etc.; 31,947 tons for moulding; 7,275 tons as core sand and 43,238 tons for other purposes. The quantity of crushed gravel produced during the year under review amounted to 2,627,358 short tons. Other sand used as mine fill in 1944 totalled 3,007,422 tons.

Firms (including individuals) reported as active in the Canadian sand and gravel industry numbered 1,541 in 1944; of these, 871 were located in Quebec, 605 in Ontario, 26 in British Columbia and lesser numbers in Nova Scotia, New Brunswick, Manitoba, Saskatchewan and Alberta. Employees were reported at 1,773; salaries and wages paid totalled \$2,494,657; fuel, electricity and process supplies used aggregated \$391,738 and the total net value of production was estimated at \$9,888,381.

Canadian exports of sand and gravel totalled 291,942 short tons valued at \$182,584 in 1944 compared with 382,319 tons worth \$212,503 in 1943. Imports of sand and gravel in 1944 totalled 83,502 short tons valued at \$57,775 as against 83,482 tons worth \$53,377 in 1943.

Imports into Canada of silica sand for manufacturing totalled 457,603 short tons valued at \$914,390 in 1944 compared with 509,043 tons worth \$1,011,117 in 1943.

The annual report on sand and gravel for 1944 as prepared by the Bureau of Mines, Ottawa, contains the following information:—

"Deposits of gravel and sand are numerous throughout Eastern Canada, with the exception of Prince Edward Island, where gravels are scarce. Owing to the widespread occurrence of gravels and sands and to their bulk in relation to value, local needs for these materials are usually supplied from the nearest deposits, as their cost to the consumer is governed largely by the length of haul; hence the large number of small pits and the small number of large plants. Some grades of sand particularly suitable for certain industries command a much higher price than does ordinary sand.

"By far the greater part of the output of gravel and sand is used in road improvement, concrete works, and railway ballast. Gravel in particular has proved a good material in the building of all-weather roads at low cost and its use has steadily increased with the growth of motor traffic. A considerable tonnage of sand and gravel is used in the mines for refilling underground workings. Some mines use several thousand tons a day.

"Most of the gravel used for road work comes from pits worked for that purpose. Usually a portable or semi-portable plant is used to extract enough gravel to supply the immediate need, and then a sufficient reserve is built up, in the form of stockpiles, for two years' requirements. Gravel in road pits may remain unused for two years or more, and the amount of gravel produced from year to year thus fluctuates, depending upon the program of road construction and improvement. Gravel in railway pits may remain unused for several years. Part of the gravel used is crushed, screened, and in some cases even washed, and the proportion thus processed is increasing steadily. Some provincial highway departments have used crushed

instead of pit-run gravel on their main highways for a number of years. Most of the large commercial plants are equipped for producing crushed gravel, a product that can compete with crushed stone.

"The amount of sand consumed follows the trend of building activity, as most of it is used in the building industry for concrete work, cement and lime mortar, or wall plaster. The sand must be free from dust, loam, organic matter, or clay and must contain only a little silt. It is usually obtainable from local deposits.

"Much sand is used also for moulding in foundries, filtering of water supply, and in making glass, all of which require special grades of sand.

"Prices of sand, gravel, and crushed stone in the four largest cities in Canada were as follows, at the end of 1943 and 1944. Prices, per ton or cubic yard, as indicated below, are for carlots, f.o.b. cars:

	Montreal		Toronto		Winnipeg		Vancouver	
	per ton		per ton		per cu. yd.		per cu. yd.	
	1943	1944	1943	1944	1943	1944	1943	1944
Sand.....	\$ 1.15	\$ 1.20	\$ 1.01	\$ 1.04	\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00
Gravel.....	1.10	1.10	1.55	1.55	1.00	1.00	1.00	1.00
Crushed stone.....	0.98	0.97	1.67	1.72	.....	.....	1.10	1.10

Table 389.—Production in Canada of Sand and Gravel, 1943 and 1944

	Washed or screened	Bank or pit run	Total Value
	tons	tons	\$
1943			
PRODUCTION (*)—			
Sand:			
Moulding sand.....	28,013	14,643	76,199
Building sand and sand for concrete, roadwork, etc.....	1,153,953	816,363	775,392
Core sand.....	1,335	.....	2,032
Mine filling.....	118,838	1,367,747	270,863
Other sand (including blast sands, engine sands, etc.).....	4,959	70,929	15,577
Sand and Gravel:			
Sand and gravel for railway ballast.....	81,697	3,755,414	712,140
Sand and gravel for concrete, road-building, etc.....	1,247,057	14,813,629	6,155,625
Crushed gravel.....	206,951	2,062,941	998,029
Total.....	2,842,803	22,901,666	9,005,857
Cost of fuel, electricity and process supplies used.....			379,435
Total net value.....			8,626,422
1944			
PRODUCTION (*)—			
Sand:			
Moulding sand.....	19,935	12,012	65,163
Building sand and sand for concrete, roadwork, etc.....	1,289,094	316,420	743,191
Core sand.....	7,275	.....	4,408
Mine filling.....	247	3,007,175	397,578
Other sand (including blast sands, engine sands, etc.).....	7,781	35,457	14,353
Sand and Gravel:			
Sand and gravel for railway ballast.....	339,982	4,088,739	900,610
Sand and gravel for concrete, road-building, etc.....	1,430,953	15,217,558	6,898,582
Crushed gravel.....	346,880	2,280,478	1,256,229
Total.....	3,442,147	24,957,839	10,280,119
Cost of fuel, electricity and process supplies used.....			391,738
Total net value.....			9,888,381

(*) Does not include production of natural silica sand or of silica sand manufactured from quartz or silica rock; production of these are recorded under quartz in the bulletin "The Feldspar and Quartz Mining Industry".

Table 390.—Production of Sand for Building and Concrete, Roads, Etc., and Sand and Gravel for Railway Ballast and for Concrete, Roads, Etc., 1935-1944

Year	Sand		Sand and Gravel			
	For building, concrete, roads, etc. (*)		For railway ballast		For concrete, roads, etc.	
	tons	\$	tons	\$	tons	\$
1935.....	787,412	264,435	2,267,195	415,092	17,531,047	5,357,331
1936.....	956,502	362,542	6,318,681	1,054,703	14,336,640	5,216,942
1937.....	1,356,269	476,824	2,764,639	533,876	19,453,188	8,340,764
1938.....	1,750,187	685,976	2,359,703	443,936	22,513,256	9,101,882
1939.....	1,169,899	364,829	3,223,718	603,288	22,899,751	8,988,114
1940.....	1,961,604	537,937	3,834,904	699,518	21,465,961	9,100,612
1941.....	2,192,405	729,901	4,836,908	916,979	19,769,798	7,135,258
1942.....	2,535,366	934,777	4,610,323	957,781	16,139,859	6,010,412
1943.....	1,970,316	775,392	3,837,111	712,140	16,060,686	6,155,625
1944—						
Nova Scotia.....			137,859	22,259	678,902	309,671
New Brunswick.....	202	30	267,095	77,158	1,320,948	662,022
Quebec.....	710,067	268,043	1,010,779	198,084	5,142,041	1,055,912
Ontario.....	725,403	403,156	1,553,024	344,685	5,997,090	3,145,153
Manitoba.....	30,103	13,116	340,879	56,164	723,678	225,069
Saskatchewan.....	1,019	202	453,759	77,535	697,031	448,304
Alberta.....	7,078	7,965	381,658	62,461	409,464	225,793
British Columbia.....	181,642	50,679	283,668	62,264	1,678,757	826,658
Canada, 1944.....	1,605,514	743,191	4,428,721	900,610	16,648,511	6,898,582

(*) Exclusive of engine and other sands and mine fill.

Table 391.—Production of Moulding and Other Sand and Crushed Gravel, 1944

Province	Mine Fillings and other sands		Moulding sand		Core sand		Crushed gravel	
			tons	\$	tons	\$	tons	\$
	tons	\$						
Nova Scotia.....			1,063	3,960			94,146	75,151
New Brunswick.....							372,137	219,314
Quebec.....	2,444	849			5,800	2,030	1,670,269	615,938
Ontario.....	847,491	211,097	30,516	60,912	1,475	2,378	374,804	250,046
Manitoba.....	1,687	625	351	260			5,750	852
Saskatchewan.....	4,036	2,308	17	36			6,635	4,790
Alberta.....	15,765	2,956					19,559	28,976
British Columbia.....	2,179,237	194,096					84,058	61,162
Canada, 1944...	3,050,660	411,931	31,947	65,168	7,275	4,408	2,627,358	1,256,229
Canada, 1943...	1,562,473	286,440	42,656	76,199	1,335	2,032	2,269,892	998,029

Table 392.—Production of Washed and Screened and Pit Run Grades, 1944

Province	Washed or screened	Bank or pit run	Total Value
	tons	tons	\$
Nova Scotia.....	117,617	794,353	411,041
New Brunswick.....	70,478	1,889,904	958,524
Quebec.....	517,779	8,023,621	2,140,856
Ontario.....	1,694,854	7,834,949	4,417,427
Manitoba.....	294,938	807,510	296,086
Saskatchewan.....		1,163,097	533,175
Alberta.....	59,048	774,476	328,151
British Columbia.....	687,433	3,669,929	1,194,859
Total.....	3,442,147	24,957,839	10,280,119

Table 393.—Production of Sand and Gravel in Canada, by Railway Operators, 1943 and 1944

Kind	1943		1944	
	Tons	Value	Tons	Value
Sand—		\$		\$
Moulding sand.....	330	990		
Building sand and sand for concrete, roads, etc.....	86,257	12,779	10,195	1,615
Other sand (including blast and engine sands).....	57,811	10,053	30,088	7,748
Sand and gravel—				
Sand and gravel for railway ballast.....	3,578,115	604,202	3,815,167	650,213
Sand and gravel for concrete, roads, etc.....	258,538	41,623	154,637	32,851
Crushed gravel.....	219,517	153,420	623,893	343,505
Total.....	4,200,568	823,067	4,633,980	1,035,932

Table 394.—Production of Sand and Gravel in Canada, by Operators, Other Than Railways, 1943 and 1944

Kind	1943			1944		
	Washed or screened	Bank or pit-run	Value	Washed or screened	Bank or pit-run	Value
Sand—	tons	tons	\$	tons	tons	\$
Moulding sand.....	28,013	14,313	75,209	19,935	12,012	65,168
Building sand and sand for concrete, roads, etc.....	1,153,953	730,106	762,613	1,289,094	306,225	741,576
Core sand.....	1,335		2,032	7,275		4,408
Other sand (including blast and engine sands).....	4,959	13,118	5,524	7,781	5,369	6,605
Sand and gravel—						
Sand and gravel for railway ballast.....	81,697	177,299	107,938	339,982	273,572	250,397
Sand and gravel for concrete, roads, etc.....	1,247,057	14,555,091	6,114,002	1,430,953	15,062,921	6,865,731
Mine filling.....	118,838	1,367,747	270,863	247	3,007,175	397,578
Crushed gravel.....	206,951	1,843,424	844,609	346,880	1,656,585	927,724
Total.....	2,842,803	18,701,098	8,182,790	3,442,147	20,323,859	9,244,187

Table 395.—Employees, Salaries and Wages in the Sand and Gravel Industry, by Provinces 1944

Province	Average number of employees			Salaries and wages		
	Salaries Employees	Wage-earners	Total	Salaries	Wages	Total
Nova Scotia.....	1	152	153	\$ 100	\$ 139,087	\$ 139,187
New Brunswick.....	2	259	261	2,320	230,649	232,969
Quebec.....	12	616	628	12,916	781,131	794,047
Ontario.....	41	289	330	74,335	494,722	569,057
Manitoba.....	16	148	164	43,881	269,453	313,334
Saskatchewan.....	•1	16	17	3,080	49,563	52,643
Alberta.....	4	63	67	24,000	113,815	137,815
British Columbia.....	29	124	153	52,638	202,967	255,605
Canada.....	*106	†1,667	1,773	213,270	2,281,387	2,494,657

* Includes 17 females.

† Includes 5 females.

Table 396.—Average Number of Wage-Earners, by Months, 1940-1944

Month	1940	1941	1942	(a) 1943	(b) 1944
January.....	274	450	369	333	377
February.....	268	440	434	358	370
March.....	346	517	524	367	379
April.....	629	815	782	665	556
May.....	3,275	4,400	3,796	3,310	2,492
June.....	8,182	8,493	5,352	5,155	5,536
July.....	11,504	8,023	4,787	5,753	3,953
August.....	7,225	7,225	3,183	4,247	2,412
September.....	8,644	3,421	1,535	2,870	1,468
October.....	3,372	2,570	1,142	2,095	711
November.....	886	764	954	714	636
December.....	628	412	528	480	499

(a) Average for year 2,227 males and 4 females.

(b) Average for year 1,662 males and 5 females.

NOTE.—This report does not include employment data relating to the production of sand and gravel in 1944 by railroads owing to the difficulty of separating statistics pertaining to part-time work conducted by railroad maintenance employees and work done by contractors. In 1944 the combined amount paid by railroads to contractors and wages paid railroad employees for the production of sand and gravel totalled \$269,453.

Table 397.—Principal Statistics of the Sand and Gravel Industry in Canada (*)
1942-1944

	1942	1943	1944
Number of firms.....	1,419	1,387	1,541
Capital employed..... \$	4,477,547	3,674,501	(†)
Number of employees—On salary.....	113	89	106
On wages.....	2,028	2,231	1,667
Total.....	2,141	2,320	1,773
Salaries and wages—Salaries..... \$	224,868	182,034	213,270
Wages..... \$	2,179,887	2,501,223	2,281,887
Total..... \$	2,404,755	2,683,257	2,494,657
Selling value of sand and gravel produced by railway companies (Gross)..... \$	844,829	823,067	1,035,932
Selling value of sand and gravel produced by other operators (Gross)..... \$	8,160,585	8,182,790	9,244,187
Total selling value of sand and gravel produced (Gross)..... \$	9,005,414	9,005,857	10,280,119
Cost of fuel and electricity..... \$	509,190	322,202	333,259
Cost of process supplies used..... \$	167,959	57,233	58,479
Total net value of production..... \$	8,328,265	8,626,422	9,888,381

(*) Includes data relating to sand production by dredgers and railways.

(†) Not reported in 1944.

MOULDING SAND (NATURAL BONDED) IN 1944

(Bureau of Mines, Ottawa)

Moulding sands are mixtures of sand and clay which, when moist, can be formed into moulds from which metal castings can be made. When suitable mixtures occur they are called natural bonded moulding sands. (Mechanically prepared moulding sand is made by the addition of bonding clay to silica).

In Canada, natural bonded moulding sands usually occur in shallow beds, sometimes of fairly uniform thickness over a considerable area, but in most cases of irregular thickness. These beds are always near the surface. The best natural bonded moulding sands are composed of fairly pure silica sand and plastic refractory clay. The clay bonding content varies approximately from 3 per cent to 30 per cent.

Every province except Prince Edward Island produces natural bonded moulding sand. At one time that province produced small quantities for local use. By far the greater part of the output, generally over 90 per cent, comes from the Niagara Peninsula in Ontario. Occasionally, new deposits have been opened up, mostly in Ontario and in the Prairie Provinces.

The results of a general investigation of moulding sands in Canada were published in 1936 by the Bureau of Mines, Ottawa, in Report No. 767 (No. 768, French edition), "Natural Bonded Moulding Sands of Canada". This report directs attention to the large number of deposits from which supplies have been obtained for local foundries and the possibility of replacing imported material with Canadian sands.

The Canadian production in 1944 was 31,947 tons valued at \$65,168, compared with 42,656 tons valued at \$76,199 in 1943. Small quantities of moulding sands not tabulated in official records are produced in nearly all the provinces by foundrymen for their own use from nearby deposits, or by part-time operators such as farmers, for local foundries. Silica sands without clay bond, used mainly in steel foundries, are not included in the above production figures.

Imports are not recorded separately, but are mostly from the United States. They greatly exceed production. Moulding sands, core sands, and other sands and gravels enter Canada duty free.

Consumption of moulding sand, core sand, silica, and other foundry sands for nine basic Canadian industries in 1943 approximated 250,000 tons.

DIRECTORY OF FIRMS 1944

In the following pages the names and addresses of all the principal operators in the Canadian mining industry are given; also the location of the properties worked in 1944.

METAL MINING INDUSTRIES

The Alluvial Gold Mining Industry

NOTE.—(x) Active but not producing.

Name	Head or executive office address	Location
BRITISH COLUMBIA—		
Acorn Placer Group.....	Blewett.....	Nelson M.D.
B. and K. Placers.....	c/o W. E. North, Wells.....	Cariboo M.D.
Bride, Maurice.....	Atlin.....	Atlin M.D.
Browne, John W.....	Atlin.....	Atlin M.D.
Browne, Haydale and Anderson.....	Atlin.....	Atlin M.D.
Brister, J. V. Company.....	Atlin.....	Atlin M.D.
Columbia Development Ltd.....	Atlin.....	Atlin M.D.
Doddy, James.....	Barkerville.....	Cariboo M.D.
Edwardson & Johnson.....	Atlin.....	Atlin M.D.
Emerdale Placers.....	Van Winkle.....	Cariboo M.D.
Felker, J. J.....	Van Winkle.....	Cariboo M.D.
Fisher and Loken.....	Atlin.....	Atlin M.D.
Fisher, N.S.....	Atlin.....	Atlin M.D.
Fry, Thomas.....	Box 118, Quesnel.....	Cariboo M.D.
Fleury, J. T. A.....	Wells.....	Cariboo M.D.
Gaensbauer and Piccolo.....	Atlin.....	Atlin M.D.
Gunn, J. J.....	Wells.....	Cariboo M.D.
Haylmore, W.....	Gold Bridge.....	Lillooet M.D.
Halverson, Gunnar.....	Barkerville.....	Cariboo M.D.
Hasbrouck, W. C.....	Keithley Creek.....	Quesnel M.D.
Holm, A.....	Barkerville.....	Cariboo M.D.
Huffman, Robert R.....	Atlin.....	Atlin M.D.
Ivanic, Steve & Co.....	Atlin.....	Atlin M.D.
Johnson, Konrad.....	Atlin.....	Atlin M.D.
Jones, D.....	Courtenay.....	Vancouver Island
Lowhee Mining Co. Ltd.....	605 Tacoma Bldg., Tacoma 2, Wash., U.S.A.	Cariboo M.D.
Melline, Fred.....	Jesmond.....	Clinton M.D.
Miller, James W.....	Marysville.....	Fort Steele M.D.
Noland, V. L.....	Atlin.....	Atlin M.D.
Noland, John W.....	Atlin.....	Atlin M.D.
Ohman, Fred & Co.....	Atlin.....	Atlin M.D.
Prpich, Tom.....	Atlin.....	Atlin M.D.
Reid, James A.....	Box 34, Salmon Arm.....	Revelstoke M.D.
Risberg, Carl A.....	Van Winkle.....	Cariboo M.D.
Swanson, O. H.....	Atlin.....	Atlin M.D.
St. Eugene Mining Corp. Ltd.....	Room 215, 602 W. Hastings St., Vancouver.....	Quesnel M.D.
Sunde, J. & Co.....	Atlin.....	Atlin M.D.
Savery, W. H.....	c/o W. E. North, Wells.....	Cariboo M.D.
Tabert, I.....	Penny.....	Cariboo M.D.
Wilson, A. J.....	Revelstoke.....	Kamloops M.D.
YUKON—		
Clear Creek Placers Ltd.....	4556 University Way, Seattle 5, Wash., U.S.A.....	Clear Creek
Lunde, V.....	Mayo.....	Dublin Gulch
Middlecoff, E.....	Mayo.....	Highet Creek
Numalake Mines Ltd (x).....	25-King St. W., Toronto, Ont.....	Scraggie Creek
Wilson and Townshend.....	Dawson.....	Last Chance Creek
Yukon Cons. Gold Corp. Ltd.....	1919 Marine Bldg., Vancouver, B.C.....	Various
Yukon Alluvial Golds Ltd. (x).....	4556 University Way, Seattle 5, Wash., U.S.A.....	Thistle and Barker Creeks

Principal Operators in the Canadian Auriferous Quartz Mining Industry

NOVA SCOTIA—		
Consolidated Mining & Smelting Co. of Canada Ltd.....	215 St. James St. W., Montreal, Que.....	Caribou Mines
Corwin Gold Mines Ltd. (x).....	c/o J. A. Corman, 155 Riverside Drive, New York, N.Y.....	Oldham
Queens Mines Ltd.....	297 Agricola St., Halifax.....	Malaga
QUEBEC—		
Anglo-Rouyn Mines Ltd. (x).....	Room 706, 100 Adelaide St. W., Toronto, Ont.....	Rouyn
Annamaque Mines Ltd. (x).....	Room 501, 67 Yonge St., Toronto, Ont.....	Bourlamaque Tp.
Ansley Gold Mines Ltd. (x).....	Room 1008, 330 Bay St., Toronto, Ont.....	Fershing Tp.

DIRECTORY OF FIRMS—Continued

Principal Operators in the Canadian Auriferous Quartz Mining Industry—Continued

NOTE.—(x) Active but not producing.

Name	Head or executive office address	Location
QUEBEC—Continued		
Arken Gold Mines Ltd. (x)	26 Adelaide St. W., Toronto, Ont.	Louvicourt Tp.
Arntfield Mining Corp. Ltd. (x)	Arntfield	Beauchastel Tp.
Astoria Quebec Mines Ltd. (x)	70 St. Paul St., Quebec	Rouyn Tp.
Aubelle Mines Ltd. (x)	Room 710, 36 Toronto St., Toronto, Ont.	Guillet Tp.
Audley Gold Mines Ltd. (x)	Room 710, Excelsior Life Bldg., Toronto, Ont.	Blondeau Tp.
Aumaque Gold Mines Ltd. (x)	Room 710 Excelsior Life Bldg., Toronto, Ont.	Bourlamaque Tp.
Auterra Mines Ltd. (x)	Room 710 Excelsior Life Bldg., Toronto, Ont.	Guillet Tp.
Bagamag Mines Ltd. (x)	Oak Ridges, Ont.	Rouyn Tp.
Beattie Gold Mines (Quebec) Ltd.	25 King St. W., Toronto, Ont.	Duparquet Tp.
Beau Pete Gold Mines Ltd. (x)	Room 714, 320 Bay St., Toronto, Ont.	Beauchastel Tp.
Bell River Mines Ltd. (x)	Room 1701, 372 Bay St., Toronto, Ont.	Louvicourt Tp.
Bellehumeur Gold Mines Ltd. (x)	302 Bay St., Toronto, Ont.	Lorrainville
Bellemac Mud Lake Mines Ltd. (x)	60 King St. W., Toronto, Ont.	Guillet Tp.
Belleterre Québec Mines Ltd.	Belleterre	Guillet Tp.
Bellezone Mines Ltd. (x)	80 Richmond St. W., Toronto, Ont.	Guillet Tp.
Bevcourt Gold Mines Ltd. (x)	1700 Royal Bank Bldg., Montreal	Louvicourt Tp.
Blairdon Gold Mines Ltd. (x)	Suite 318, 371 Bay St., Toronto, Ont.	Tibblemont Tp.
Blondor Quebec Mines Ltd. (x)	Suite 1008, 330 Bay St., Toronto, Ont.	Belleterre
Bluegrass Raymond Mines Ltd. (x)	Room 404, 200 Bay St., Toronto, Ont.	Vauquelin Tp.
Bonsecour Mines Ltd. (x)	307 Central Bldg., Toronto, Ont.	Carpentier Tp.
Brenmore Quebec Mines Ltd. (x)	355 St. James St. W., Montreal	Guillet Tp.
Bonters Mining Corp. Ltd. (x)	Room 204, 80 Richmond St. W., Toronto, Ont.	Blondor Tp.
Canadian Malartic Gold Mines Ltd.	25 King St. W., Toronto, Ont.	Malartic
Central Duparquet Mines Ltd. (x)	Duparquet	Duparquet Tp.
Cere, Gustave	Box 429, Val d'Or	Various
Citralam Malartic Mines Ltd. (x)	907 Victory Bldg., Toronto, Ont.	Vassan Tp.
Cluny Gold Mines Ltd. (x)	Room 504, 357 Bay St., Toronto, Ont.	Guillet Tp.
Columbiere Mines Ltd. (x)	Room 501, 67 Yonge St., Toronto, Ont.	Bourlamaque Tp.
Croinor Pershing Mines Ltd. (x)	Amos	Pershing Tp.
Croscount Gold Mines Ltd. (x)	404 Temple Bldg., Toronto	Louvicourt Tp.
Dierterre Gold Mines Ltd. (x)	Room 501, 67 Yonge St., Toronto, Ont.	Guillet Tp.
Dome Exploration Co. (Que.) Ltd. (x)	Bourlamaque	Various
Dominion Malartic Gold Mines Ltd. (x)	Room 16, 24 King St. W., Toronto, Ont.	Cadillac Tp.
Dondalda Mines Ltd. (x)	414 St. James St. W., Montreal	Rouyn Tp.
Dunford Rouyn Mines Ltd. (x)	714, 320 Bay St., Toronto, Ont.	Rouyn Tp.
Donrand Mines Ltd. (x)	100 Adelaide St. W., Toronto, Ont.	Rouyn Tp.
Dubuisson Mines Ltd. (x)	516 Canada Cement Bldg., Montreal	Various
Dovercliffe Gold Mines Ltd. (x)	1104, 67 Yonge St., Toronto, Ont.	Rouyn Tp.
Dupresnoy Mines Ltd. (x)	Room 2810, 25 King St. W., Toronto, Ont.	Duprat Tp.
Donabelle Mines Ltd. (x)	301 Montreal Trust Bldg., Toronto, Ont.	Devlin Tp.
East Amphl Gold Mines Ltd. (x)	Malartic	Malartic Tp.
East Malartic Mines Ltd.	355 St. James St. W., Montreal	Norrie
Elder Gold Mines Ltd. (x)	Room 602, 11 King St. W., Toronto, Ont.	Duprat Tp.
Eld Sullivan Mines Ltd. (x)	1604 Aldred Bldg., Montreal	Bourlamaque Tp.
Eldona Gold Mines Ltd. (x)	330 Bay St., Toronto, Ont.	Rouyn Tp.
Flobec Gold Mines Ltd. (x)	372 Bay St., Toronto, Ont.	Guillet Tp.
Formaque Gold Mines Ltd. (x)	610 St. James St. W., Montreal	Bourlamaque Tp.
Franeour Gold Mines Ltd.	941 Dominion Square Bldg., Montreal	Arntfield
Frobisher Exploration Co. Ltd. (x)	25 King St. W., Toronto, Ont.	Various
Garden Mines Ltd. (x)	Room 907, 80 Richmond St. W., Toronto, Ont.	Pershing Tp.
Girard Lake Mines Ltd. (x)	Suite 1008, 330 Bay St., Toronto, Ont.	Belleterre
Glidmac Mining Co. Ltd. (x)	Room 717, 132 St. James St. W., Montreal	Aiguebelle Tp.
Golden Valley Mines Ltd. (x)	80 Richmond St. W., Toronto, Ont.	Dasserat Tp.
Goldora Mines Ltd. (x)	Suite 1608, 80 King St. W., Toronto, Ont.	Bourlamaque Tp.
Goldvue Mines, Ltd. (x)	100 Adelaide St. W., Toronto	Amos
Harpers Malartic Gold Mines Ltd. (x)	Room 1405, 100 Adelaide St. W., Toronto, Ont.	Dubuisson
Harricana Gold Mines Inc. (x)	Room 209, 330 Bay St., Toronto, Ont.	Dubuisson Tp.
Heva Cadillac Gold Mines Ltd. (x)	Room 16, 24 King St. W., Toronto, Ont.	Joannes Tp.
Hosco Gold Mines Ltd. (x)	357 Bay St., Toronto, Ont.	Bousquet Tp.
Howey Gold Mines Ltd. (x)	244 Bay St., Toronto, Ont.	Rouyn Tp.
Hugh Malartic Mines Ltd. (x)	907 Victory Bldg., Toronto, Ont.	Malartic Tp.
Kenda Pershing Mines Ltd. (x)	Room 620, 12 Richmond St. E., Toronto, Ont.	Pershing Tp.
Kayrand Mining & Development Co. Ltd. (x)	Room 301, 215 St. James St. W., Montreal	Dalquier Tp.
Kenikonda Mining Corp. Ltd. (x)	Suite 414, 11 King St. W., Toronto, Ont.	Beauchastel Tp.
Kenojevis River Mines Ltd. (x)	Room 428, 67 Yonge St., Toronto, Ont.	Clericy Tp.
Lady Rouyn Mines Ltd. (x)	710 Northern Ontario Bldg., Toronto, Ont.	Joannes Tp.
Lake Expanse Gold Mines Ltd. (x)	Suite 1207, 67 Yonge St., Toronto, Ont.	Guillet Tp.
Lamaque Mining Co. Ltd.	Bourlamaque	Bourlamaque
LaPalartic Mines Ltd. (x)	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Malartic Tp.
Lapaska Mines Ltd. (x)	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Louvicourt Tp.
Lavalie Mines Ltd. (x)	Room 116, 85 Richmond St. W., Toronto, Ont.	Bourlamaque Tp.
Lochland Pershing Mines Ltd. (x)	Room 1001, Federal Bldg., Toronto, Ont.	Pershing Tp.
Louvicourt Goldfield Corp. (x)	1604 Aldred Bldg., Montreal	Louvicourt Tp.

DIRECTORY OF FIRMS—Continued

Principal Operators in the Canadian Auriferous Quartz Mining Industry—Continued

NOTE.—(x) Active but not producing.

Name	Head or executive office address	Location
QUEBEC—Concluded		
Louvoire Gold Mines Ltd. (x).....	Room 204, 80 Richmond St. W., Toronto, Ont.	Louviciourt Tp.
Macfort Gold Mines Ltd. (x).....	67 Yonge St., Toronto, Ont.	Dasserat Tp.
Malartic Gold Fields Ltd.....	355 St. James St. W., Montreal.....	Dubuisson Tp.
Malartic River Mines Ltd. (x).....	Val d'Or.....	Malartic Tp.
Manterre Gold Mines Ltd. (x).....	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Fairlie Tp.
Marbenor Malartic Mines Ltd. (x).....	710 Excelsior Life Bldg., Toronto, Ont.	Dubuisson Tp.
Marlon Rouyn Gold Mines Ltd. (x).....	Room 16, 24 King St. W., Toronto, Ont.	Rouyn Tp.
Mascot Malartic Mines Ltd. (x).....	Room 1107, 330 Bay St., Toronto, Ont.	Fournier Tp.
McWatters Gold Mines Ltd.....	Drawer 988, Haileybury, Ont.	Rouyn Tp.
Mic Mac Mines Ltd.....	Box 290, Noranda.....	Bousquet Tp.
Montmagny Gold Mines Ltd. (x).....	c/o J. W. Mackenzie, Arntfield.....	Rouyn Tp.
Mining Corp. of Canada Ltd. (x).....	Suite 602, 350 Bay St., Toronto, Ont.	Various
Mylamaque Mines Ltd. (x).....	Room 407, 67 Yonge St., Toronto, Ont.	Bourlamaque Tp.
New Bidlamaque Gold Mines Ltd. (x).....	Room 714, 320 Bay St., Toronto, Ont.	Bourlamaque Tp.
New Malartic Gold Mines Ltd. (x).....	516 Canada Cement Bldg., Montreal.....	Fournier Tp.
Norbenite Malartic Mines Ltd. (x).....	330 Bay St., Toronto, Ont.	Malartic
Norgold Mines (1937) Ltd. (x).....	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Louviciourt Tp.
Norseman Mines Ltd. (x).....	80 Richmond St. W., Toronto, Ont.	Bourlamaque Tp.
North Belleterre Gold Mines Ltd. (x).....	Room 907, 80 Richmond St. W., Toronto, Ont.	Devlin Tp.
North Malartic Gold Mines Ltd. (x).....	Noranda.....	Malartic Tp.
Nortyne Gold Mines Ltd. (x).....	907 Victory Bldg., Toronto, Ont.	Manneville Tp.
O'Brien Gold Mines Ltd.....	Kewagama.....	Cadillac Tp.
Ortona Gold Mines Ltd. (x).....	Room 812, 67 Yonge St., Toronto, Ont.	Belleterre
Pandora Limited (x).....	Cadillac.....	Cadillac
Parmaque Mines Ltd. (x).....	Room 710, 36 Toronto St., Toronto, Ont.	Bourlamaque Tp.
Parbee Malartic Gold Mines Ltd. (x).....	Room 610, 67 Yonge St., Toronto, Ont.	Malartic Tp.
Pen Rey Gold Mines Ltd. (x).....	Room 907, 80 Richmond St. W., Toronto, Ont.	Rouyn Tp.
Perron Gold Mines Ltd.....	Perron.....	Pascalis Tp.
Pershing Manitou Gold Mines Ltd. (x).....	132 St. James St. W., Montreal.....	Courville Tp.
Poulmaque Gold Mines Ltd. (x).....	Box 666, Val d'Or.....	Bourlamaque Tp.
Powell Rouyn Gold Mines Ltd.....	Box 200, Noranda.....	Rouyn Tp.
Paquin Gold Mines Ltd. (x).....	Belleterre.....	Guillet Tp.
Quebec Ore Zone Ltd. (x).....	Suite 2810, 25 King St. W., Toronto, Ont.	Joannes Tp.
Rambull Gold Mines Ltd. (x).....	907 Victory Bldg., Toronto, Ont.	Fiquery Tp.
Randona Quebec Gold Mines Ltd. (x).....	Room 209, 330 Bay St., Toronto, Ont.	Dufresnoy Tp.
Raylartic Cons. Mines Ltd. (x).....	Room 21, 33 Melinda St., Toronto, Ont.	Dasserat Tp.
Raymond Tiblemont Gold Mines Ltd. (x).....	200 Bay St., Toronto, Ont.	Vaquin Tp.
Rayon D'Or Mines Ltd. (x).....	Room 803, 66 King St. W., Toronto, Ont.	Val d'Or
Rebagou Rouyn Mines Ltd. (x).....	710 Excelsior Life Bldg., Toronto.....	Rouyn Tp.
Regocourt Gold Mines Ltd. (x).....	1700 Royal Bank Bldg., Montreal.....	Louviciourt Tp.
Renfort Gold Mines Ltd. (x).....	1006 Concourse Bldg., Toronto, Ont.	Beauchastel Tp.
Revelartic Mines Ltd. (x).....	Room 508, 11 King St. W., Toronto, Ont.	Cadillac Tp.
Rodcor Mines Ltd. (x).....	c/o L. C. Barlow, 199 Bay St., Toronto, Ont.	Dubuisson Tp.
Rochette Gold Mines Ltd. (x).....	540 rue Boucher, Montreal.....	Lounay Tp.
Rouyn Merger Gold Mines Ltd. (x).....	Room 603, Royal Bank Bldg., Toronto, Ont.	Rouyn Tp.
Scout Pershing Mines Ltd. (x).....	907 Victory Bldg., Toronto, Ont.	Pershing Tp.
Senator-Rouyn Ltd.....	45A Main St., Hull.....	Rouyn Tp.
Seventh Malartic Mines Ltd. (x).....	355 St. James St. W., Montreal.....	Dubuisson Tp.
Sigma Mines (Quebec) Ltd.....	Bourlamaque.....	Bourlamaque Tp.
Siscoe Gold Mines Ltd.....	907 Dominion Square Bldg., Montreal.....	Siscoe
Sladen-Malartic Mines Ltd.....	56 Sparks St., Ottawa, Ont.	Malartic
Stadacona Rouyn Mines Ltd.....	10 St. James St. E., Montreal.....	Rouyn
Steeley Mining Corp. Ltd.....	Room 710, 80 King St. W., Toronto, Ont.	Preissac Tp.
Sullivan Cons. Mines Ltd.....	1604 Aldred Bldg., Montreal.....	Dubuisson Tp.
Terrebonne Mines Ltd. (x).....	Room 609, 68 Yonge St., Toronto, Ont.	Guillet Tp.
Thurbois Mines Ltd. (x).....	201 Park Bldg., Windsor, Ont.	Destor Tp.
Torbee Mines Ltd. (x).....	710 Excelsior Life Bldg., Toronto, Ont.	Guillet Tp.
Toburn Gold Mines Ltd. (x).....	Royal Bank Bldg., Toronto, Ont.	Dasserat Tp.
Wakeko Mines Ltd. (x).....	Suite 1207, 67 Yonge St., Toronto, Ont.	Beauchastel Tp.
Wasa Lake Gold Mines Ltd. (x).....	1006 Concourse Bldg., Toronto, Ont.	Beauchastel Tp.
Wingait Gold Mines Ltd. (x).....	Room 907, 80 Richmond St. W., Toronto, Ont.	Beauchastel Tp.
West Malartic Mines Ltd.....	7000 Jeanne Mance St., Montreal.....	Cadillac Tp.
West Shore Malartic Gold Mines Ltd. (x).....	Room 905, 407 McGill St., Montreal.....	Malartic Tp.
Wetting Gold Mines Ltd. (x).....	Duparquet.....	Duparquet Tp.
Wiltsey Coghlan Mines (Que.) Ltd. (x).....	Suite 1010, 100 Adelaide St. W., Toronto, Ont.	Rouyn Tp.
ONTARIO—		
<i>Porcupine Area—</i>		
Amor Gold Mines Ltd.....	1600 Royal Bank Bldg., Toronto.....	Timmins
Bonetal Gold Mines Ltd.....	1705 Sterling Tower Bldg., Toronto.....	Pamour
Broulan Porcupine Mines Ltd.....	1705 Sterling Tower Bldg., Toronto.....	Pamour
Buffalo Ankerite Gold Mines Ltd.....	Box 533, South Porcupine.....	South Porcupine
Burley Porcupine Mines Ltd. (x).....	907 Victory Bldg., Toronto.....	Whitney Tp.
Comiaurum Mines Ltd.....	25 King St. W., Toronto.....	Schumacher
Delnite Mines Ltd.....	Box 590, Timmins.....	Doloro Tp.
Dome Mines Ltd.....	36 Toronto St., Toronto.....	South Porcupine.
Hallnor Mines Ltd.....	Pamour.....	Pamour

DIRECTORY OF FIRMS—Continued

Principal Operators in the Canadian Auriferous Quartz Mining Industry—Continued

NOTE.—(x) Active but not producing.

Name	Head or executive office address	Location
ONTARIO—Continued		
<i>Porcupine Area—Concluded</i>		
Hollinger Cons. Gold Mines Ltd. (Hollinger)	Timmins.....	Timmins
Hollinger Cons. Gold Mines Ltd. (Ross)...	Timmins.....	Hislop Tp.
Hoyle Mining Co. Ltd.	Box 40, Haileybury.....	Whitney Tp.
Hugh-Pam Porcupine Mines Ltd. (x).....	Room 601, 371 Bay St., Toronto.....	Whitney Tp.
Jasper Porcupine Mines Ltd. (x).....	43 Colborne St., Toronto.....	Deloro Tp.
McIntyre Porcupine Mines Ltd.....	Schumacher.....	Schumacher
Pamour Porcupine Mines Ltd.....	Pamour.....	Pamour
Paymaster Cons. Mines Ltd.....	Box 508, South Porcupine.....	Deloro and Tisdale Tps.
Preston East Dome Mines Ltd.....	South Porcupine.....	South Porcupine
Troup Porcupine Mines Ltd. (x).....	302 Sterling Tower, Toronto.....	Whitney Tp.
Windyke Mines Ltd. (x).....	Room 1412, 55 York St., Toronto.....	Rickard Tp.
Wilcarr Mines Ltd. (x).....	80 King St. W., Toronto.....	Wilkie and Carr Tps.
<i>Kirkland Lake Area—</i>		
Belrosa Mines Ltd. (x).....	1001 Federal Bldg., Toronto.....	Lebel Tp.
Bigdoo Kirkland Gold Mines Ltd.....	Box 850, Kirkland Lake.....	Lebel Tp.
Biroco Kirkland Mines Ltd. (x).....	1705 Sterling Towers, Toronto.....	Lebel Tp.
Continental Kirkland Mines Ltd. (x).....	1809 Royal Bank Bldg., Toronto.....	Lebel Tp.
Erin Kirkland Mines Ltd. (x).....	Room 1104, 67 Yonge St., Toronto.....	Lebel Tp.
Kirkland Lake Gold Mining Co. Ltd.....	Box 850, Chaput-Hughes.....	Teck Tp.
Kirgood Gold Mines Ltd. (x).....	Room 502, 80 Richmond St. W., Toronto.....	Lebel Tp.
Lake Shore Mines Ltd.....	Kirkland Lake.....	Teck Tp.
Macassa Mines Ltd.....	85 Richmond St. W., Toronto.....	Kirkland Lake
Northland Mines Ltd. (x).....	171 Yonge St., Toronto.....	Gauthier Tp.
Rocamsa Mines Ltd. (x).....	1001 Federal Bldg., Toronto.....	Lebel Tp.
Scott Chibaugamau Mines Ltd. (x).....	215 St. James St. W., Montreal, Que.....	Gauthier Tp.
Sylvanite Gold Mines Ltd.....	Box 670, Kirkland Lake.....	Teck Tp.
Teck Hughes Gold Mines Ltd.....	Kirkland Lake.....	Kirkland Lake
Toburn Gold Mines Ltd.....	1809 Royal Bank Bldg., Toronto.....	Kirkland Lake
Upper Canada Mines Ltd.....	1001 Federal Bldg., Toronto.....	Gauthier Tp.
Wright-Hargreaves Mines Ltd.....	Fort Erie.....	Kirkland Lake
<i>Larder Lake Area—</i>		
Anoki Gold Mines Ltd. (x).....	1006 Concourse Bldg., Toronto.....	Gauthier Tp.
Armistice Gold Mines Ltd. (x).....	Room 706, 100 Adelaide St. W., Toronto.....	McGarry Tp.
Chesterville Larder Lake Gold Mining Co. Ltd.	Suite 1104, 330 Bay St., Toronto.....	Kearns
Kentlake Gold Mines Ltd. (x).....	32 Prospect Ave., Kirkland Lake.....	Gauthier
Kerr-Addison Gold Mines Ltd.....	Room 1108, 80 King St. W., Toronto.....	McGarry Tp.
Largold Mining Co. Ltd. (x).....	Room 204, 80 Richmond St. W., Toronto.....	McGarry Tp.
Mary Ann Mines Ltd. (x).....	100 Adelaide St. W., Toronto.....	McVittie Tp.
Olivet Gold Mines Ltd. (x).....	Room 313, 156 Yonge St., Toronto.....	Gauthier Tp.
Omega Gold Mines Ltd.....	Larder Lake.....	McVittie Tp.
Pelangio-Larder Mines Ltd. (x).....	32 Prospect Ave., Kirkland Lake.....	McGarry Tp.
Poona Gold Mines Ltd. (x).....	Suite 210, 331 Bay St., Toronto.....	McVittie Tp.
Tovarich-Larder Gold Mines Ltd. (x).....	Room 1701, 372 Bay St., Toronto.....	McVittie Tp.
Winchester Larder Mines Ltd. (x).....	1101 Federal Bldg., Toronto.....	McGarry Tp.
<i>Matatchewan Area—</i>		
Hollinger Cons. Gold Mines Ltd. (Young-Davidson)	Timmins.....	Powell Tp.
Laroma Midlothian Mines Ltd. (x).....	372 Bay St., Toronto.....	Midlothian Tp.
Matatchewan Cons. Mines Ltd.....	25 King St. W., Toronto.....	Powell Tp.
<i>Sudbury Area—</i>		
Jerome Gold Mines Ltd. (x).....	602, 350 Bay St., Toronto.....	Osway Tp.
Osway Gold Mines Ltd. (x).....	708, 357 Bay St., Toronto.....	Osway Tp.
<i>Thunder Bay Area—</i>		
Birch Bay Gold Mines Ltd. (x).....	603 Royal Bank Bldg., Toronto.....	Long Lake
Hard Rock Gold Mines Ltd.....	Geraldton.....	Ashmore Tp.
Leitch Gold Mines Ltd.....	Beardmore.....	Eva Tp.
Little Long Lac Gold Mines Ltd.....	3100, 25 King St. W., Toronto.....	Errington Tp.
Lake Bearskin Mining Synd. (x).....	606 Public Utilities Bldg., Port Arthur.....	Nezah
MacLeod-Cockshutt Gold Mines Ltd.....	357 Bay St., Toronto.....	Geraldton
Marquette Long Lac Gold Mines Ltd. (x).....	503, 357 Bay St., Toronto.....	Errington Tp.
<i>Kenora and Rainy River Area—</i>		
Classic Sturgeon Gold Mines Ltd. (x).....	217 Bay St., Toronto.....	Savant Lake
<i>Patricia District—</i>		
Berens River Mines Ltd.....	Favourable Lake.....	Favourable Lake
Carricono Mines Ltd. (x).....	305-350 Bay St., Toronto.....	Red Lake
Central Patricia Gold Mines Ltd.....	Central Patricia.....	Central Patricia
Cochenour Willans Gold Mines Ltd.....	801 Dominion Bank Bldg., Toronto.....	McKenzie Island
Craibbe-Fletcher Gold Mines Ltd. (x).....	Room 1, 26 Adelaide St. W., Toronto.....	Red Lake
Crowshore Patricia Gold Mines Ltd. (x).....	171 Yonge St., Toronto.....	Pickle Crow
Campbell Red Lake Mines Ltd. (x).....	Room 407, 67 Yonge St., Toronto.....	Balmer Tp.

DIRECTORY OF FIRMS—Continued

Principal Operators in the Canadian Auriferous Quartz Mining Industry—Concluded

(x) Active but not producing.

Name	Head or executive office address	Location
ONTARIO—Concluded		
<i>Patricia District—Concluded</i>		
Derlak Red Lake Gold Mines Ltd. (x).....	1001 Federal Bldg., Toronto.....	Heyson Tp.
Dickenson Red Lake Mines Ltd. (x).....	200 Bay St., Toronto.....	Balmer Tp.
Hasaga Gold Mines Ltd.....	25 King St. W., Toronto.....	Red Lake
Madsen Red Lake Gold Mines Ltd.....	67 Yonge St., Toronto.....	Madsen
McKenzie Red Lake Gold Mines Ltd.....	19 Richmond St. W., Toronto.....	McKenzie Island
McMarmac Red Lake Gold Mines Ltd.....	Room 803, 66 King St. W., Toronto.....	Dome Tp.
Mills Red Lake Mines Ltd. (x).....	Room 712, 80 King St. W., Toronto.....	Red Lake
Pickle Crow Gold Mines Ltd.....	Pickle Crow.....	Pickle Crow
Redaurum Red Lake Gold Mines Ltd. (x).....	100 Adelaide St. W., Toronto.....	Red Lake
Russet Red Lake Gold Mines Ltd. (x).....	24 King St. W., Toronto.....	Red Lake
Wilson Red Lake Gold Mines Ltd. (x).....	Room 1116, 85 Richmond St. W., Toronto.....	Red Lake
MANITOBA—		
Goldbeam Mines Ltd. (x).....	75 Summit Ave., Toronto, Ont.....	Falcon Lake Dist.
Red Cloud Mining & Smelting Ltd. (x).....	503 Huron & Erie Bldg., Winnipeg.....	Bear River Dist.
San Antonio Gold Mines Ltd.....	237 Curry Bldg., Winnipeg.....	Rice Lake
SASKATCHEWAN—		
Newcor Mining & Refining Ltd. (x).....	67 Yonge St., Toronto, Ont.....	Douglas Lake
NORTHWEST TERRITORIES—		
Ace Yellowknife Mines Ltd. (x).....	Room 907, 80 Richmond St. W., Toronto, Ont.....	Yellowknife
Aurora Yellowknife Mines Ltd. (x).....	Room 706, 100 Adelaide St. W., Toronto, Ont.....	Yellowknife
Belle-Bry Yellowknife Mines Ltd. (x).....	Room 706, 100 Adelaide St. W., Toronto, Ont.....	Yellowknife
Cardinal Yellowknife Gold Mines Ltd. (x).....	Room 501, 67 Yonge St., Toronto, Ont.....	Yellowknife
Cons. Mining & Smelting Co. of Canada Ltd. (x).....	Trail, B.C.....	Yellowknife
Giant Yellowknife Gold Mines Ltd. (x).....	25 King St. W., Toronto, Ont.....	Yellowknife
Homer Yellowknife Mines Ltd. (x).....	330 Bay St., Toronto, Ont.....	Yellowknife
Lynx Yellowknife Gold Mines Ltd. (x).....	25 King St. W., Toronto, Ont.....	Yellowknife
Meewood Yellowknife Mines Ltd. (x).....	611 Temple Bldg., Toronto, Ont.....	Gordon Lake
Negus Mines Ltd.....	410 Royal Bank Bldg., Toronto, Ont.....	Yellowknife
Quebec Yellowknife Gold Mines Ltd. (x).....	Room 717, 132 St. James St. W., Montreal, Que.....	Duck Lake
Ranney Gold Mines Ltd. (x).....	25 King St. W., Toronto, Ont.....	Yellowknife
BRITISH COLUMBIA—		
Bralorne Mines Ltd.....	555 Burrard St., Vancouver.....	Bralorne
B.R.X. Cons. Mines Ltd. (x).....	Room 616, 475 Howe St., Vancouver.....	Bridge River
Cariboo Gold Quartz Mining Co. Ltd.....	1007 Royal Bank Bldg., Vancouver.....	Wells
Cariboo Mines.....	Greenwood.....	Greenwood
Cons. Mining & Smelting Co. of Canada Ltd. (x).....	Trail.....	Nanaimo and Nelson M.D.
Gem Gold Mines Ltd. (x).....	1604 Royal Bank Bldg., Vancouver.....	Texada Island
Gold Belt Mining Co. Ltd. (x).....	Room 616, 475 Howe St., Vancouver.....	Sheep Creek
Hankedahl, E. (Ymir).....	Ymir.....	Ymir
Hedley Mascot Gold Mines Ltd.....	908 Royal Bank Bldg., Vancouver.....	Hedley
Island Mountain Mines Co. Ltd.....	Wells.....	Wells
I.X.L. Leasing Syndicate.....	Box 122, Rossland.....	Trail Creek M.D.
Kelowna Exploration Co. Ltd.....	Hedley.....	Hedley
Kootenay Belle Gold Mines Ltd.....	916 Stock Exchange Bldg., Vancouver.....	Sheep Creek
McArthur, W. E., and Son (Gold Finch).....	Box 629, Greenwood.....	Greenwood
Penney, A. (Kalamalka).....	Lavington.....	Vernon M.D.
Pioneer Gold Mines of B.C. Ltd.....	607 Rogers Bldg., Vancouver.....	Pioneer Mine
Privateer Mine Ltd. (x).....	Room 602, 475 Howe St., Vancouver.....	Zeballos
Second Relief Mine.....	Salmo.....	Salmo
Sheep Creek Gold Mines Ltd.....	616 Stock Exchange Bldg., Vancouver.....	Sheep Creek
Silbak Premier Mines Ltd.....	626 Pender St. W., Vancouver.....	Premier
Solovcoff, Fred. (Miracle).....	Blewett.....	Nelson M.D.

Operators in Canadian Copper-Gold-Silver Mining Industry

QUEBEC—		
Aldermac Copper Corp. Ltd.....	941 Dominion Square Bldg., Montreal.....	Beauchastel Tp. Ascot Tp.
Cons. Mining & Smelting Co. of Canada Ltd. (x).....	215 St. James St. W., Montreal.....	Bourlamaque Tp.
Can Copper Mines Ltd. (x).....	293 Bay St., Toronto, Ont.....	Beauchastel Tp.
Horne Fault Mines Ltd. (x).....	Duparquet.....	Beauchastel Tp.
Lake Dufault Mines Ltd.....	Duparquet.....	Dufresnoy Tp.
Letourneau, Joseph (x).....	Disraeli.....	Dufresnoy
Macdonald Mines Ltd. (x).....	414 St. James St. W., Montreal.....	Stratford Tp.
Noranda Mines Ltd.....	1600 Royal Bank Bldg., Toronto, Ont.....	Dufresnoy Noranda

DIRECTORY OF FIRMS—Continued

Operators in Canadian Copper-Gold-Silver Mining Industry—Concluded

(x) Active but not producing.

Name	Head or executive office address	Location
QUEBEC—Concluded		
Normetal Mining Corp. Ltd.	Suite 602, 350 Bay St., Toronto, Ont.	Desmeloizes Tp.
Quemont Mining Corp. Ltd. (x)	Suite 602, 350 Bay St., Toronto, Ont.	Rouyn Tp.
Touton Mining & Exploraiton Co. Ltd. (x)	500 Place d'Armes, Montreal	Fabre Tp.
Vachon-Vachon Prospecting Soc. (x)	138 Cockburn St., Drummondville	Beauce Co.
Waite Amulet Mines Ltd.	Noranda	Duprat Tp.
West Amulet Mines Ltd. (x)	Room 2810, 25 King St. W., Toronto	Duquesnoy Tp. Duprat Tp.
ONTARIO—		
Bandolac Mining Co. Ltd. (x)	39 LaBelle Bldg., Windsor	L. Shebandowan Lake
Kam-Kotia Porcupine Mines Ltd.	Timmins	Robb Tp.
Lobanor Gold Mines Ltd. (x)	Room 318, 331 Bay St., Toronto	Shebandowan
Royalite Gold Synd.	c/o H. Goldman, 569 Church St., Toronto	Salter Tp.
MANITOBA—		
Emergency Metals Ltd.	500 Royal Bank Bldg., Winnipeg	The Pas M.D.
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Bldg., Winnipeg	The Pas M.D.
International Mining Corp. (x)	622 Federal Bldg., Toronto, Ont.	Various
Sheritt Gordon Mines Ltd.	Room 2810, 25 King St. W., Toronto, Ont.	Sheridon
SASKATCHEWAN—		
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Bldg., Winnipeg, Man.	The Pas Dist.
BRITISH COLUMBIA—		
Britannia Mining & Smelting Co. Ltd.	Britannia Beach	Britannia Beach
Granby Cons. Mining, Smelting & Power Co. Ltd.	675 West Hastings St., Vancouver	Copper Mountain
Industrial Metals Mining Co. Ltd.	626 W. Pender St., Vancouver	Nanaimo M.D.
Wartime Metals Corp. (Twin J)	637 Craig St., Montreal, Que.	Duncan

Operators in Canadian Silver-Cobalt Mining Industry

Name of operator	Head office address	Location
ONTARIO—		
Augener Mines Ltd. (x)	Box 643, Cobalt	Coleman Tp.
Ausic Mining & Reduction Co. Ltd. (x) (Genesee & Silver Cliff)	Box 643, Cobalt	Coleman Tp.
Cross Lake Lease (O'Brien)	Box 390, Cobalt	Coleman Tp.
Cross Lake Lease (Miller Lake O'Brien)	Box 390, Cobalt	Haultain Tp.
Davis, Norman B. (Werner Lake)	512 Victoria Bldg., Ottawa	Kenora Dist.
McCready, W. E. (Hudson Bay)	Cobalt	Cobalt
Mercier, Raul (Foster)	Box 547, Cobalt	Coleman Tp.
O'Shaughnessy, C. V. J. (O'Brien mill)	Box 319, Cobalt	Cobalt
Presse, Albert (Nipissing)	215 Lang St., Cobalt	Cobalt
Price, C. H. (Kerr Lake)	Cobalt	Kerr Lake
Silanco Mining & Smelting Corp. Ltd.	45 Richmond St. W., Toronto	Cobalt Dist.
Silco Mines Ltd. (x)	Suite 501, 67 Yonge St., Toronto	Gillies Limit
Sutherland, J. H. (Lawson)	Cobalt	Coleman Tp.

NOTE.—In addition to the names listed, there were some small shippers from whom official reports were unobtainable. Mine names shown in brackets.

Principal Operators in the Canadian Silver-Lead-Zinc Mining Industry

QUEBEC—		
Federal Zinc & Lead Co. Ltd. (x)	708 Drummond Bldg., Montreal	Lemieux Tp.
Golden Manitou Mines Ltd.	Room 1104, 330 Bay St., Toronto, Ont.	Bourlons Tp.
Lyall and Beidelman (x)	708 Drummond Bldg., Montreal	Lemieux Tp.
New Calumet Mines Ltd.	25 King St. W., Toronto, Ont.	Calumet Island
Perras Hermas Synd. (Tetreault mine)	4 Notre Dame St. E., Montreal	Fortneuf Co.
Siscoe Metals Ltd. (Tetreault mine)	907 Dominion Square Bldg., Montreal	Fortneuf Co.
ONTARIO—		
Lake Geneva Mining Co. Ltd.	941 Dominion Square Bldg., Montreal, Que.	Hess Tp.
BRITISH COLUMBIA—		
Base Metals Mining Corp. Ltd.	350 Bay St., Toronto 1, Ont.	Field
Comara Mining & Milling Co. Ltd. (x)	815 Queen St. W., Toronto, Ont.	Ferguson

DIRECTORY OF FIRMS—Continued

Principal Operators in the Canadian Silver-Lead-Zinc Mining Industry—Concluded

Name of operator	Head office address	Location of mine
BRITISH COLUMBIA—Concluded		
Cons. Mining & Smelting Co. of Can. Ltd....	Trail.....	Kimberley
Cons. Nicola Goldfields Ltd.....	322-744 West Hastings St., Vancouver.....	Nicola M.D.
Doney, Ernest (Victor).....	Box 414 New Denver.....	Slocan, M.D.
Highland Bell Ltd.....	Creston.....	Beaverdell
Kootenay Bell Gold Mines Ltd. (a).....	916 Stock Exchange Bldg., Vancouver.....	Retallack
Ottawa Mining & Milling Co.....	Slocan.....	Springer Creek
Providence Mine Synd.....	Box 629 Greenwood.....	Greenwood
Sheep Creek Gold Mines Ltd.....	616 Stock Exchange Bldg., Vancouver.....	Zineton
Wartime Metals Corp. (b).....	637 Craig St. W., Montreal, Que.....	Ainsworth
Western Exploration Co. Ltd.....	Silverton.....	Kaslo M.D.
YUKON—		
Berry, A. F.....	Mayo.....	Mayo
Brefalt & Fournier.....	Mayo.....	Mayo
Gordon & Bjønnes.....	Mayo.....	Mayo
Sinyard, C.....	Mayo.....	Mayo
Treadwell Yukon Corp. (c).....	1022 Crocker Bldg., San Francisco, Cal.....	Mayo
Williamson & Butyer.....	Mayo.....	Mayo

(a) Retallack Mines project.

(b) Kootenay-Florence project.

(c) No operations; acted as shipping agent only.

The Nickel-Copper Mining, Smelting and Refining Industry in Canada

(*) Active but not producing.

ONTARIO—		
Falconbridge Nickel Mines, Ltd.....	304 Bay St., Toronto.....	Falconbridge Tp.
Harlin Nickel Mines Ltd.....	Room 503, 357 Bay St., Toronto.....	Porquus Jct.
International Nickel Company of Canada, Limited.....	Copper Cliff.....	Mines: Tps. of Levack, Snider, McKim and Garsen Smelters: Copper Cliff and Coniston Nickel refinery: Port Colborne Copper refinery: Copper Cliff Foy Tp. Bowell Tp.
Nickel Offsets Ltd.....	Room 1701, 372 Bay St., Toronto.....	
North Range Nickel Mines Ltd. (*).....	Suite 501, 67 Yonge St., Toronto.....	

FIRMS IN THE MISCELLANEOUS METAL MINING INDUSTRY IN CANADA

(*) Active but not producing.

Name of firm and product	Head office address	Location of mine or plant
Aluminum—		
Aluminum Company of Canada Limited....	1700 Sun Life Bldg., Montreal, Que.....	Arvida, Que. Shawinigan Falls, Que. La Tuque, Que. Isle Maligne, Que. Beauharnois, Que.
Antimony—		
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Beryl—		
Canadian Beryllium Mines & Alloys Ltd. (*).....	Room 401, 100 Adelaide St. W., Toronto, Ont.....	Renfrew Co., Ont.
Bismuth—		
Deloro Smelting & Refining Co. Ltd. (*).....	900 Victoria Bldg., Ottawa, Ont.....	Deloro, Ont.
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Cadmium—		
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Hudson Bay Mining & Smelting Co. Ltd.....	500 Royal Bank Bldg., Winnipeg, Man.....	Flin Flon, Man.

DIRECTORY OF FIRMS—Continued

FIRMS IN THE MISCELLANEOUS METAL MINING INDUSTRY IN CANADA—Concluded

(*) Active but not producing.

Name of firm and product	Head office address	Location of mine or plant
Chromite—		
Chrome Association.....	342 Notre Dame St., Black Lake, Que.....	Black Lake, Que.
Chromore Ltd.....	399 Notre Dame St., Thetford Mines, Que...	Caleraîne Twp., Que.
Chromite Ltd.....	404 Notre Dame St. W., Montreal Que.....	Cleveland Twp., Que.
Metivier, Willis B.....	Black Lake, Que.....	Caleraîne Twp., Que.
Pare, Orel.....	Black Lake, Que.....	Caleraîne Twp., Que.
Wartime Metals Corp. (Chromeraîne Project)	637 Craig St. W., Montreal, Que.....	Caleraîne Twp., Que.
Iron Ore—		
Goyette, A. E. (*).....	4295 St. Hubert St., Montreal, Que.....	Arthabaska Co., Que.
Hollinger North Shore Exploration Co. Ltd.	(*).....	
Labrador Mining & Exploration Co. Ltd. (*)	721 Royal Bank Bldg., Montreal, Que.....	N. E. Quebec, Que.
Titan Steel Corp.....	721 Royal Bank Bldg., Montreal, Que.....	Labrador, Que.
Algoma Ore Properties Ltd.....	80 St. Peter St., Quebec.....	Moisie Bay, Que.
Michipicoten Iron Mines Ltd. (*).....	Cornwall Bldg., Sault Ste. Marie, Ont.....	Algoma dist., Ont.
Rebair Gold Mines Ltd. (*).....	25 King St. W., Toronto, Ont.....	Algoma dist., Ont.
Sarpedon Iron Mines Ltd. (*).....	9 Adelaide St. E., Toronto, Ont.....	Atikokan, Ont.
Steep Rock Iron Mines Ltd.....	1101 Federal Bldg., Toronto, Ont.....	Rainy River dist., Ont.
Tomahawk Iron Mines Ltd. (*).....	25 King St. W., Toronto, Ont.....	Rainy River dist., Ont.
	Suite 405, 67 Yonge St., Toronto, Ont.....	Hastings Co., Ont.
Indium—		
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Lithium Ore—		
Hudson Bay Mining & Smelting Co. Ltd. (*)	500 Royal Bank Bldg., Winnipeg, Man.....	Cat Lake, Man.
Lithium Corporation of Canada Ltd. (*).....	403 Avenue Bldg., Winnipeg, Man.....	Bernic and Cat Lakes, Man.
Sheritt Gordon Mines Ltd. (*).....	25 King St. W., Toronto, Ont.....	Crowduck Bay, Man.
		East Braintree, Man.
Magnesium—		
Consolidated Mining & Smelting Company of Canada Ltd. (*).....	215 St. James St., Montreal, Que.....	Trail, B.C.
Dominion Magnesium Ltd.....	Room 1107, 67 Yonge St., Toronto, Ont.....	Haley, Ont.
Mercury—		
Bralorne Mines Ltd.....	555 Burrard St., Vancouver, B.C.....	Omineca District, B.C.
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Pinchi Lake, B.C.
Molybdenite—		
Indian Molybdenum Ltd.....	Bourlamaque, Que.....	Preissac Twp., Que.
Quyon Molybdenite Co. Ltd.....	Quyon, Que.....	Quyon, Que.
Wartime Metals Corp. (LaCome Project).....	637 Craig St. W., Montreal, Que.....	Abitibi Co., Que.
Selenium-Tellurium—		
International Nickel Co. of Canada Ltd.....	Copper Cliff, Ont.....	Copper Cliff, Ont.
Canadian Copper Refiners Ltd.....	1600 Royal Bank Bldg., Toronto, Ont.....	Montreal East, Que.
Thallium—		
Hudson Bay Mining & Smelting Co. Ltd.....	500 Royal Bank Bldg., Winnipeg, Man.....	Flin Flon, Man.
Tin—		
Consolidated Mining & Smelting Company of Canada Ltd.....	215 St. James St., Montreal, Que.....	Trail, B.C.
Titanium Ore—		
Baie St. Paul Titanic Iron Ore Co.....	Baie St. Paul, Que.....	St. Urbain, Que.
Coulombe, J.....	71 Ave. Royal Monument, Quebec, Que.....	St. Urbain, Que.
Simack Ulmenite Co. Ltd.....	c/o C. N. Knowles & Co., 360 St. James St. W., Montreal, Que.....	Romaine River Dist. Que.
Tungsten Concentrates—		
B.C. War Metals Research Board (a).....	University of British Columbia, Vancouver, B.C.....	Vancouver, B.C.
Hollinger Cons. Gold Mines Ltd.....	Timmins, Ont.....	Timmins, Ont.
Wartime Metals Corp. (Emerald Tungsten Project).....	637 Craig St. W., Montreal, Que.....	Salmon, B.C.

(a) treated alluvial material from Yukon.

DIRECTORY OF FIRMS—Continued

Firms in the Canadian Non-Ferrous Smelting and Refining Industry

Name of firm	Head or executive office address	Location of plant
Quebec—		
Aluminum Company of Canada Ltd.....	1700 Sun Life Bldg., Montreal.....	Arvida, Shawinigan Falls, La Tuque, Isle Maligne, Beauharnois
Canadian Copper Refiners Ltd.....	1600 Royal Bank Bldg., Toronto, Ont.....	Montreal East
Noranda Mines Limited.....	1600 Royal Bank Bldg., Toronto, Ont.....	Noranda
Ontario—		
Deloro Smelting & Refining Co. Limited....	Deloro.....	Deloro
Dominion Magnesium Ltd.....	67 Yonge St., Toronto.....	Haley
Eldorado Mining and Refining.....	80 King St. W., Toronto.....	Port Hope
Falconbridge Nickel Mines Ltd.....	304 Bay St., Toronto.....	Falconbridge
International Nickel Co. of Canada Limited..	Copper Cliff.....	Copper Cliff, Coniston, Port Colborne
Manitoba—		
Hudson Bay Mining and Smelting Co. Limited.....	500 Royal Bank Bldg., Winnipeg.....	Flin Flon
British Columbia—		
Consolidated Mining & Smelting Co. of Canada Limited.....	Trail.....	Trail

NON-METAL MINING INDUSTRIES, INCLUDING FUELS

FUELS

DIRECTORY OF FIRMS—Continued

Coal Mining Industry

Name	Address	Location
NOVA SCOTIA—		
Acadia Coal Co., Ltd.	Trenton	District—
Beech Hill Coal Co.	River Hebert	Pictou.
Bras d'Or Coal Co. Ltd.	Bras d'Or	Cumberland.
Campbell, A. J.	Inverness	Cape Breton.
Chestico	Port Hood	Inverness.
Cumberland Ry. & Coal Co.	Sydney	Inverness.
Dominion Coal Co. Ltd.	Sydney	Cumberland.
Doucet, S. J.	Inverness	Cape Breton.
Greenwood Coal Co. Ltd.	New Glasgow	Inverness.
Hillcrest Mining Co. Ltd.	River Hebert	Pictou.
Indian Cove Coal Co., Ltd.	Sydney Mines	Cumberland.
Intercolonial Coal Co., Ltd.	Westville	Cape Breton.
Inverness Coal Mine	Inverness	Pictou.
Joggins Coal Co., Ltd.	Amherst	Inverness.
Kempton Coal Mine	Kempton	Cumberland.
McLellan & Sons, J.A.	Inverness	Cumberland.
Margaree Steamship Co.	Inverness	Inverness.
Old Sydney Collieries Ltd.	Trenton	Inverness.
Standard Coal Co. Ltd.	Amherst	Cape Breton.
Sullivan Coal Co. Ltd.	Sydney Mines	Cumberland.
		Cape Breton.
NEW BRUNSWICK—		
Avon Coal Co., Ltd.	Minto	County—
Butler, Stanley	Newcastle Bridge	Queens.
Crawford, E. S.	Newcastle Bridge	Queens.
Evans, W. B.	Minto	Queens.
Flower, H. L.	Newcastle Creek	Queens.
Fearon, Bertrum	Beersville	Kent.
Girvan, H. H.	Jailletville	Kent.
Horgan, F. J.	Chipman	Queens.
King, G. H.	Chipman	Queens.
McDonald, J. F.	Minto	Queens.
McMann, Hugh	Newcastle Creek	Queens.
Minto Coal Co. Ltd.	Minto	Queens.
Miramichi Lumber Co. Ltd.	Minto	Queens.
Newcastle Coal Co.	Minto	Queens.
Rothwell Coal Co. Ltd.	Minto	Queens.
Welton Harvey Ltd.	Minto	Queens.
Welton & Henderson Ltd.	Minto	Queens.
Wisely, W. B.	Chipman	Queens.
Woodcock, A. G.	Fredericton	Queens.
Yeamans, C. S.	Newcastle Bridge	Queens.
MANITOBA—		
Goodlands Mine Co.	Goodlands.	
SASKATCHEWAN—		
NOTE.—SOURIS AREA— Comprises mines at or near Bienfait, Taylorton, Pinto, Estevan and Roche Percee.		
WOOD MOUNTAIN AREA— Comprises mines at or near Assiniboia, Bengough, Willow Bunch and Wood Mountain.		
SHAUNAVON AREA— Comprises mines at or near Shaunavon, Dollard, South Fork and East End.		
Area—		
Anderson, Peter	Marstone	Wood Mountain.
Anderson, Niels	Estevan	Souris.
Assels, Glen Alexander	Shaunavon	Shaunavon.
Banks, H.	Bienfait	Souris.
Banks, H.	Pinto	Souris.
Beahrn, George	Roan Mine	Wood Mountain.
Beauchesne, O.	St. Victor	Wood Mountain.
Bednarik, John	Shaunavon	Shaunavon.
Belz, Werner	Buffalo Gap	Wood Mountain.
Bembridge, J.	Bienfait	Souris.
Berge, Telford	Buffalo Gap	Wood Mountain.
Berg, J.	Dollard	Shaunavon.
Blondeau, A.	Roche Percee	Souris.
Bouffard, Emile	Willow Bunch	Wood Mountain.
Bourquin & Sons, G.	Estevan	Souris.
Bourquin & Sons, L. E.	Estevan	Souris.
Brandieze, Jos.	Coronach	Wood Mountain.
Brown, H.	Big Beaver	Wood Mountain.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
SASKATCHEWAN—Concluded		Area—
Brown, Alton G.	Wideview	Wood Mountain.
Coats & Kingdon	Bienfait	Souris.
Culbert, Wesley	Minton	Wood Mountain.
Desjardin, F.	Willow Bunch	Wood Mountain.
Dovell, A. C.	Eastend	Shaanavon.
Dupuis, R.	Scout Lake	Wood Mountain.
Eastern Collieries of Bienfait	Estevan	Souris.
Eikemo & Peterson	Gladmar	Wood Mountain.
Emery, E. G.	Readlyn	Wood Mountain.
Fair, J. A.	Harpree	Wood Mountain.
Finnberg, N.	Fir Mountain	Wood Mountain.
Fister, J. J.	Big Beaver	Wood Mountain.
Flower Bros.	Estevan	Souris.
Freeman, Bruce	Southfork	Shaanavon.
Furuskjeg, A.	Minton	Wood Mountain.
Glombowski, Rudolph	Ardill	Wood Mountain.
Gosselin, Raymond	Willow Bunch	Wood Mountain.
Gosselin, C.	Dollard	Shaanavon.
Guse, L.	Bengough	Wood Mountain.
Havanah Collieries	Estevan	Souris.
Higgins, James	Willow Bunch	Wood Mountain.
High Test Lignite Coal Co. Ltd.	Bienfait	Souris.
Jacques, Jos.	Southfork	Shaanavon.
Jenish Bros.	Estevan	Souris.
Jones, Wm.	Viceroy	Wood Mountain.
Karlson, Ernest	Glentworth	Wood Mountain.
Kirkpatrick, H.	Shaanavon	Shaanavon.
Kissner, A.	Assiniboia	Wood Mountain.
Klyne & Son, T.	Roche Percee	Souris.
Knoblauch, Ed.	Shaanavon	Shaanavon.
Lapointe, Louis	Buffalo Gap	Wood Mountain.
Larsen, Peter	Eastend	Shaanavon.
Leatherdale, D.	Gladmar	Wood Mountain.
Lebeck, A.	Buffalo Gap	Wood Mountain.
Lee, Austin M.	Big Beaver	Wood Mountain.
Lid, Bjarne	Minton	Wood Mountain.
Livingston, Kelly	Rockglen	Wood Mountain.
Man, & Sask. Coal Co. Ltd.	503 Ave. Bldg., Winnipeg, Manitoba	Souris.
Matheson & Uhrich	Pinto	Souris.
McCuaig, M.	Fife Lake	Wood Mountain.
McGillis, J. M.	Willow Bunch	Wood Mountain.
Morrison, Ray	Big Beaver	Wood Mountain.
Nordstrom, C.	Estevan	Souris.
North West Coal Co.	Bienfait	Souris.
Olson and Klyne	Estevan	Souris.
Olshanoski, J.	Estevan	Souris.
Osjust, Steve	Estevan	Souris.
Parkinson, Geo.	Estevan	Souris.
Pohl, Henry	Buffalo Gap	Wood Mountain.
Riedel Bros.	Bienfait	Souris.
Roche Percee Coal Mining Co. Ltd.	Roche Percee	Souris.
Rock Spring Coal Co.	Pinto	Souris.
Salaba, G. J.	Willow Bunch	Wood Mountain.
Scott, Ervin	Viceroy	Wood Mountain.
Slater, Dan	Bengough	Wood Mountain.
South Cambrian Ltd.	Pinto	Souris.
Southernwood, E.	Estevan	Souris.
Spirka & Novak	Shaanavon	Shaanavon.
Straza, D. J.	Wood Mountain	Wood Mountain.
Taje & Co., Ed.	Estevan	Souris.
Tarita, Paul	Stonehenge	Wood Mountain.
Tessier & Insko	Estevan	Souris.
Tipple, J.	Lonsome Butte	Wood Mountain.
Tisdale, A. E.	Estevan	Souris.
Treleaven, Wm.	Bengough	Wood Mountain.
Treleaven, J.	Bengough	Wood Mountain.
Wagner & Mattson	Bengough	Wood Mountain.
Warren, Wm.	Fife Lake	Wood Mountain.
Western Dom. Coal Mines Ltd.	Taylorlton	Souris.
Wilhelm, John	Verwood	Wood Mountain.
Wilkins, H. W.	Shaanavon	Shaanavon.
Wilkins, L. F.	Shaanavon	Shaanavon.
Youngberg Bros., H. McBurney & C. H. Uhrich	Willow Bunch	Wood Mountain.
ALBERTA—		District—
Bituminous—		Nordeg.
Brazear Collieries Ltd.	25 King St. W., Toronto, Ontario	Mountain Park.
Cadomin Coal Co. Ltd.	418 McLeod Bldg., Edmonton	Cascade.
Cannore Mines Ltd.	Cannore	Crowsnest.
Hillcrest Mohawk Collieries Ltd.	Bellevue	Crowsnest.
Holmes, F.	Pincher Creek	Crowsnest.
International Coal & Coke Co. Ltd.	Coleman	Crowsnest.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
ALBERTA—Continued		
Bituminous—Continued		
K. D. Collieries Ltd.....	103 Pinder Bldg., Saskatoon, Sask.....	District— Mountain Park.
Luscar Coals Ltd.....	410 Tegler Bldg., Edmonton.....	Mountain Park.
McGillivray Creek Coal & Coke Co., Ltd..	Coleman.....	Crowsnest.
Mountain Park Coals Ltd.....	410 Tegler Bldg., Edmonton.....	Mountain Park.
West Canadian Collieries Ltd.....	Blairmore.....	Crowsnest.
Wheatley, F. & Sons.....	Banff.....	Cascade.
Sub-bituminous—		
Ainsley, B.....	5717-3rd St. S.W. Calgary.....	Morley.
Alexo Coal Co. Ltd.....	Alexo.....	Saunders.
Bighorn & Saunders Creek Collieries Ltd..	Saunders.....	Saunders.
Coal Valley Mining Co. Ltd.....	Coal Valley.....	Coalspur.
Davies, G. C.....	Priddis.....	Pekisko.
Foothills Collieries Ltd.....	Foothills.....	Coalspur.
Jasper Coals Ltd.....	Edmonton.....	Prairie Creek.
Keith Albert.....	Lundbreck.....	Pincher.
Lakeside Coals Ltd.....	Edmonton.....	Coalspur.
McLeod River Hard Coal Co. (1941) Ltd..	Nanaimo, B.C.....	Coalspur.
Sterling Collieries Co. Ltd.....	Edmonton.....	Coalspur.
Swan, H. & Son.....	Priddis.....	Pekisko.
Thirty-Two Collieries Ltd.....	Edmonton.....	Coalspur.
Lignite—		
Aetna Coal Co.....	East Coulee.....	Drumheller.
Ajax Coal Co.....	Medicine Hat.....	Redcliff.
Arcadia Coal Mines Ltd.....	Willow Creek.....	Drumheller.
Atlas Coal Mine (Regal Coal Co. Ltd.).....	East Coulee.....	Drumheller.
Baldwin, J. N. & L. A.....	Grand Prairie.....	Halcourt.
Balogh, Aaron.....	Carbon.....	Carbon.
Banner Coals Ltd.....	Edmonton.....	Edmonton.
Barrell, W.....	Ardley.....	Ardley.
Beverly Coal Co. Ltd.....	Beverly.....	Edmonton.
Big Valley Coal Co.....	Big Valley.....	Big Valley.
Birnwel Coal Ltd.....	Calgary.....	Brooks.
Bish Bros.....	Forestburg.....	Castor.
Blackfoot Indian Agency.....	Gleichen.....	Gleichen.
Black Nugget Coal Co. Ltd.....	Dodds.....	Tofield.
Blades, James.....	Delburne.....	Ardley.
Boice & Ginther.....	Elnora.....	Big Valley.
Bordula, A. J.....	Hanna.....	Sheerness.
Bradshaw, Richard.....	Trochu.....	Carbon.
Bradley, James.....	Foreman.....	Castor.
Bright Service Coal Mine.....	Edmonton.....	Edmonton.
Brilliant Coal Co.....	Drumheller.....	Drumheller.
Burn Brite Coal Co.....	Drumheller.....	Drumheller.
Burnstad, S. H.....	Ohaton.....	Camrose.
Bush Mines Ltd.....	Edmonton.....	Edmonton.
Buxton, Arthur.....	Lonira.....	Whitecourt.
Campkin, R. & Sons.....	Lousana.....	Big Valley.
Camrose Collieries Ltd.....	Camrose.....	Camrose.
Camarta, John.....	Cardiff.....	Edmonton.
Castle Coal Co.....	Wayne.....	Drumheller.
Castor Creek Collieries Ltd.....	Castor.....	Castor.
Chester Mine.....	Lethbridge.....	Lethbridge.
Chiarello, Frank.....	Legal.....	Edmonton.
Chinook Coal Co.....	Sheerness.....	Sheerness.
Chiswick, J.....	Gadsby.....	Castor.
Commander Coal Mine (Regal Coal Co. Ltd.)	Drumheller.....	Drumheller.
Continental Coal Corp.....	Grassy Lake.....	Taber.
Cordel, J. F.....	Halkirk.....	Castor.
Cotek, William.....	R. R. 3, S. Edmonton.....	Edmonton.
Dahl & Cage.....	Halcourt.....	Halcourt.
Dawson Coal Ltd.....	Edmonton.....	Edmonton.
Denio, Ernest.....	Drumheller.....	Drumheller.
Dickinson, Knight and Dickinson.....	R. R. 2, St. Albert.....	Edmonton.
Dodds Coal Mine.....	Dodds.....	Tofield.
Dunbar, J. & Partners.....	Hinton Trail.....	Halcourt.
Easton, James.....	Castor.....	Castor.
East Carbon Coal Co.....	Carbon.....	Carbon.
East Trochu Coal Mine.....	Trochu.....	Carbon.
Edmonton Collieries Ltd.....	Edmonton.....	Edmonton.
Egg Lake Coal Co.....	Morinville.....	Edmonton.
Empire Collieries Ltd.....	East Coulee.....	Drumheller.
Forsyth & Arnold.....	Lethbridge.....	Lethbridge.
Foye, E. B.....	Drumheller.....	Drumheller.
Fraser, Alec.....	Carmanagay.....	Champion.
Fridel and Opalinski (Pine Creek Coal Co.)	R. R. 3, S. Edmonton.....	Edmonton.
Gainford Coal Co.....	Gainford.....	Pembina.
Gill, Peter.....	Thorsby.....	Wetaskiwin.
Great West Coal Co.....	10117-100A St. Edmonton.....	Edmonton.
Gunderson Brick & Coal Co. Ltd.....	Redcliff.....	Redcliff.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Continued

Name	Address	Location
ALBERTA—Continued		
Lignite—Continued		
Guiney, C. J.	Rosebud.	District—
Gwilliam, D. J.	Namao.	Gleichen.
Haden, J.	Castor.	Edmonton.
Hamilton Coal Co., J. J.	Lethbridge.	Castor.
Hamilton, John.	Delia.	Lethbridge.
Hanson, C. H.	Rosalind.	Drumheller.
Herbaut, A.	Champion.	Castor.
Howorth & Fraser.	Halcourt.	Champion.
Hronek, Ben.	Halkirk.	Halcourt.
Hy-Grade Coal Mining Co. Ltd.	Drumheller.	Castor.
Johnson, Alex.	Ardley.	Drumheller.
Ideal Coal Co. Ltd.	Wayne.	Ardley.
Inland Coal Co.	Three Hills.	Drumheller.
Ironside, T. G.	Scapa, R.R. 2.	Carbon.
Jones & Son.	Forestburg.	Sheerness.
Kehl & McGladrie.	Nevis.	Castor.
Kent Coal Co. Ltd.	Edmonton.	Ardley.
Kerralta Coal Co.	Lethbridge.	Edmonton.
Kleenbirm Collieries Ltd.	Eyzemore.	Lethbridge.
K. M. Coal Mine.	Forestburg.	Brooks.
Kurp, Carl.	Delbourne.	Castor.
Lakeside Coals Ltd.	Edmonton.	Ardley.
Lavenne, C.	Bow Island.	Pembina.
Le Gear, Max.	Forestburg.	Taber.
Lethbridge Collieries Ltd.	Lethbridge.	Castor.
Lien, E.	Edberg.	Lethbridge.
Litke Bros.	Hanna.	Castor.
Long Coal Co.	Namao.	Sheerness.
Lynass, John.	Delburne.	Edmonton.
Majestic Mines Ltd.	Taber.	Ardley.
Maple Leaf Minerals Ltd.	Drumheller.	Taber.
Marshall, John W.	Donalda.	Drumheller.
Masciangelo, John.	Delia.	Castor.
McGaw, A. M. S.	Champion.	Sheerness.
McKinlay & Son, James.	Huxley.	Champion.
McMillan, Alex.	Rosebud.	Big Valley.
Midland Coal Mining Co. Ltd.	Drumheller.	Gleichen.
Mills & Sons, J. J.	Heisler.	Drumheller.
Minute Coal Co.	Drumheller.	Drumheller.
Mitchinson, Thomas.	Donalda.	Castor.
Molzan, Henry.	S. Edmonton.	Edmonton.
Monarch Coal Mining Co. Ltd.	Drumheller.	Edmonton.
Morel, M. E.	Ghost Pine Creek.	Drumheller.
Mueller, J. J.	Masinasin.	Carbon.
Muney, H. C.	Foreman.	Milk River.
Munro & Son, S. S.	Ardley.	Castor.
Murray Collieries Ltd.	East Coulee.	Ardley.
Newcastle Collieries Ltd.	Drumheller.	Drumheller.
New Royal View Mine.	Lethbridge.	Drumheller.
Nimko, K.	S. Edmonton.	Lethbridge.
North Point Coal Co.	Thorhild.	Edmonton.
Nottal & Davidson.	Three Hills.	Rochester.
O'Brien and Davis.	Halkirk.	Carbon.
Oliver, E.	Taber.	Castor.
Opalinski & Sinoski.	S. Edmonton.	Taber.
Ottewell Coal Co.	Clover Bar.	Edmonton.
Pahl, Fred M.	Hanna.	Edmonton.
Pastorchik & Partners.	Three Hills.	Sheerness.
Peerless Coal Co.	Carbon.	Carbon.
Pembina Collieries Ltd.	Entwistle.	Carbon.
Phillips, W. T.	Castor.	Pembina.
Pickering, B.	Beynon.	Castor.
Popovitch, M.	Champion.	Drumheller.
Pritchard, R. F.	Blue Ridge.	Champion.
Proskow, Jos.	Dinant.	Whitecourt.
Red Deer Valley Coal Co. Ltd.	Drumheller.	Camrose.
Red Flame Coal Co. Ltd.	Round Hill.	Drumheller.
Red Hot Coal Co. Ltd.	Edmonton.	Camrose.
Raeder, W.	Elkwater.	Edmonton.
Remillard, O. V.	Castor.	Pakowki.
Riddock & Horkulak.	S. Edmonton.	Castor.
Riverdale Coal Co. Ltd.	Edmonton.	Edmonton.
Robinson, W.	Entwistle.	Edmonton.
Rollingson, George.	Lethbridge.	Pembina.
Rosedale Collieries Ltd.	Aerial.	Lethbridge.
Rosedale Collieries Ltd.	Rosedale.	Drumheller.
Rozzolini & Bridarolli.	Magrath.	Drumheller.
Russell, Chas. O.	Alix.	Lethbridge.
Ryley Coal Mine.	Ryley.	Ardley.
Ryning, Jas. W.	Rowley.	Tofield.
Samis, K. E.	Namao.	Carbon.
Sank, John.	Heisler.	Edmonton.
		Castor.

DIRECTORY OF FIRMS—Continued

Coal Mining Industry—Concluded

Name	Address	Location
ALBERTA—Concluded		
Lignite— <i>Concluded</i>		District—
Schlender, Otto	Trochu	Carbon.
Schnept, Karl	Rosebud	Gleichen.
Sheerness Coal Co. Ltd.	Sheerness	Sheerness.
Shute & Partners	Dinant	Camrose.
Sinoski, Mike	S. Edmonton	Edmonton.
Sissons, J. W.	Alix	Ardley.
Skauge & Bailey	Gadsby	Castor.
Smith, Howard	Edmonton	Edmonton.
Sorken, A.	Killam	Castor.
Sovereign Coal Co. Ltd.	Wayne	Drumheller.
Spencer & Dolphin	Carbon	Carbon.
Staite, A. E.	Trochu	Carbon.
Standard Coal Mine	Standard	Gleichen.
Stoney Creek Collieries Ltd.	Camrose	Camrose.
Strader, Chas.	Halkirk	Castor.
Straub, F. A.	Alix	Ardley.
Strickhuk, Leo	R. R. 2, Ohaton	Camrose.
Strickland, T.	Heisler	Castor.
Stubbs, T. D.	Hanna	Sheerness.
Taylor, Thomas	Groton	Milk River.
Thorild Coal Co.	Thorild	Rochester.
Tofield Coal Co. Ltd.	Tofield	Tofield.
Twin City Coal Ltd.	S. Edmonton	Edmonton.
Tyrlik, John	Heisler	Castor.
Watson, Alex.	Blue Ridge	Whitecourt.
Western Gem & Jewel Collieries Ltd.	Rosedale	Drumheller.
Western Ventures Ltd.	Lethbridge	Taber.
Whittaker, O. W.	Beynon	Drumheller.
Wilkinson & Strader	Halkirk	Castor.
Wilma Coal Co.	Edmonton	Pembina.
Wiltse, F. N.	Halkirk	Castor.
Wood & Larson	High Prairie	No Area.
Yellowknife Transport Co. Ltd.	10509-100th Ave., Edmonton	Edmonton.
BRITISH COLUMBIA—		
British Lands Ltd.	Kelowna	Inland.
Bulkley Valley Collieries Ltd.	Telkwa	Inland.
Canadian Collieries (Dunsmuir) Ltd.	Nanaimo	Inland.
Cassidy Mines	Nanaimo	Inland.
Chambers, R. H.	Nanaimo	Inland.
Coldwater Colliery	Merritt	Inland.
Consolidated Mg. & Smelting Co. Ltd.	Trail	Crows' Nest Pass.
Crow's Nest Pass Coal Co. Ltd.	Fernie	" " "
Deer Home Mine	Extension	Inland.
Gething Coal Mine	Hudson Hope	Inland.
Hasler Creek Coal Co. Ltd.	Dawson Creek	Inland.
Hat Creek Coal Mines	Ashcroft	Inland.
Johnston, Carl Emil	Cottonwood	Inland.
Frater, George	Nanaimo	Inland.
Lewis Mine	Nanaimo	Inland.
Loudon, W. D.	Wellington	Inland.
Merritt Coal Mines Ltd.	Merritt	Inland.
Middlesboro Collieries Ltd.	Merritt	Inland.
Packwood Mine	Fort St. John	Inland.
Pacific Coal Mine	Nanaimo	Inland.
Peace River Coal Mines Ltd.	Hudson Hope	Inland.
Princeton Tulameen Coal Co. Ltd.	Princeton	Inland.
Stronach Mine	Wellington	Inland.
Telkoal Co. Ltd.	Telkwa	Inland.
Tulameen Collieries Ltd.	Vancouver	Inland.
Wellington No. 9 Coal Mine	Nanaimo	Inland.

Firms in the Natural Gas Industry in Canada

NOTE.—(a) Drilling only. (c) Drilling and producing.
 (b) Distributing only. (d) Pipe line company.
 (e) Using or selling gas from absorption plant.

Name	Address	Location—Field
NEW BRUNSWICK—		
Moncton Electricity and Gas Co. Ltd. (b)...	700 Main St., Moncton.	Stoney Creek
New Brunswick Gas & Oilfields Ltd.....	Box 194, Moncton.....	
ONTARIO—		
Achilles Oil & Gas Syndicate.....	67 Yonge St., Toronto.....	Woodhouse

DIRECTORY OF FIRMS—Continued

Firms in the Natural Gas Industry in Canada—Continued

Name	Address	Location—Field
ONTARIO—Continued		
Ajax Oil & Gas Co. Ltd.	371 Bay St., Toronto	Dover, Tuscarora and Middleton
Aloka Oil & Gas Co.	57 Queen St. W., Toronto	Dereham and Malahide
Amer-Can Oil & Gas Co.	215 King St. W., Chatham	Dover, Tilbury East and Walpole
Ashton, J. L. (a)	Chatham	
Barnhart, Mrs. E.	Stevensville	Bertie
Bates, Norman	R. R. 1, Humberstone	Humberstone
Beachville Gas Syndicate (b)	Beachville	
Beacon Natural Gas Syndicate	112 Locust St., Kitchener	Walpole
Beaver Oil & Gas Syndicate	67 Yonge St., Toronto	Walpole
Beaver Utilities Ltd. (b)	421 Richmond St., London	
Beer, George	Binbrook	Binbrook
Belmont Gas Co. (b)	978 Church St., Windsor	
Benn, A. S.	R. R. 1, Hagersville	Walpole
Benner, K. W.	Fisherville	Rainham and Walpole
Bertie Gas & Oil Syndicate	Fisherville	Bertie and Willoughby
Binbrook Gas Co.	Binbrook	Binbrook
Bliss, Douglas E.	Tillsonburg	Middleton
Brindley & Harper	Dunnville	Brantford
Broadway Gas Syndicate	R. R. 3, Cayuga	Walpole and Cayuga North
Buck, C. S.	Port Rowan	Walsingham South
Burchell Gas Syndicate	R. R. 2, Listowel	Woodhouse and Raleigh
Canada Cement Co. Ltd.	Box 290, Montreal, Que.	Wainfleet
Canadian Natural Gas Syndicate	Simcoe	Bayham and Moulton
Canfield Gas Syndicate	206 Douglas Blvd., Windsor	Cayuga North
Canfield Natural Gas Co.	Dunnville	Cayuga North
Cartwright, S. E.	1972 Pemobscot Bldg., Detroit, Mich., U.S.A.	Walpole
Central Ontario Gas & Oil Well Drilling Co. (a)	Toronto	
Central Pipe Line Co. Ltd.	Chatham	Bayham, Houghton and Malahide
Central Seneca Gas Syndicate	R. R. 3, Cayuga	Seneca
City Gas Company of London (b)	London	
Colbert, M. A.	18 Sun Life Bldg., Hamilton	Walpole
Coleman, J. A.	Wellandport	Gainsboro
Columbia Natural Gas & Oil Co. Ltd.	907 Pigott Bldg., Hamilton	Dunn
Coronation Gas Syndicate	Stevensville	Bertie
Culver, M. & Son (a)	Rainham Centre	
Dain City Gas Syndicate	208 Burgar St., Welland	Bertie and Humberstone
Dawson, Ralph	Merlin	Tilbury East
Dean Gas Syndicate	Fisherville	Middleton and Bayham
Delhi Gas Syndicate	Cayuga	Windham
Dereham Gas & Oil Co. Ltd.	67 Yonge St., Toronto	Oneida, Walpole, Rainham and Walsingham South
Dominion Natural Gas Co. Ltd.	518 Jackson Bldg., Buffalo, N. Y. U.S.A.	Aldborough, Binbrook, Caistor, Canboro, Charlotteville, Delhi Village, Dunn, Glanford, Humberstone, Mersea, Middleton, Moulton, Cayuga North, North Walsingham, Oneida, Onondaga, Port Dover Village, Port Rowan, Rainham, Raleigh, Romney, Seneca, Sherbrooke, South Cayuga, South Walsingham, Tilbury East, Townsend, Wainfleet, Walpole, Windham, Woodhouse, North Dorchester, Malahide, Southwold, Yarmouth, South Norwich and West Oxford
Dorset Oil & Gas Syndicate	67 Yonge St., Toronto	Cayuga South
Drake & Walker	Walkerville	Malden
Dunn Natural Gas Co. Ltd.	81 St. Paul St., St. Catharines	Dunn and Sherbrooke
Dunnville-Detroit Gas Syndicate	206 Douglas Blvd., Windsor	Cayuga North
Economy Natural Gas Syndicate	25 Market Place, Stratford	Woodhouse
Elgin Prospecting Syndicate	Ridgeway	Humberstone
Elk Development Syndicate (c)	Cayuga South	Humberstone
Emerald Gas Syndicate	67 Yonge St., Toronto	Oneida
Emerson, Harry L. (c)	R. R. 1, Dunnville	Canboro, Moulton and Wainfleet
Emerson, Lloyd W. (a)	Wainfleet	
Evans, Harry L. (a)	Tillsonburg	
Featherstone, Roy	Caledonia	Oneida
Fisherville Gas Co.	Fisherville	Rainham
Fleet Aircraft Ltd.	Fort Erie	Bertie
Fletcher, Mrs. Eva	Glanford Station	Binbrook

DIRECTORY OF FIRMS—Continued

Firms in the Natural Gas Industry in Canada—Continued

Name	Address	Location—Field
ONTARIO—Continued		
Fonthill & Ridgeville Gas Co. Ltd. (b).....	Box 511, Portland, Indiana, U.S.A.	Bertie
Frontier Gas Syndicate.....	Fisherville.....	Raleigh
Gas Producers Syndicate.....	206 Douglas Blvd., Windsor.....	Cayuga South
Gifford, Arthur & Son.....	R. R. 2, Cayuga.....	Canboro
Glenny, D.....	R. R. 5, Dunnville.....	Cayuga North
Grand River Gas & Oil Syndicate.....	Canfield.....	Caistor, Gainsboro and
Grimsby Natural Gas Co. Ltd.....	Grimsby.....	Canboro
Haldimand Gas Syndicate.....	Cayuga.....	Rainham
Haldimand Natural Gas Syndicate.....	Stevensville.....	Bertie
Highbank Oil Ltd.....	Chatham.....	Raleigh
Hoover, A. E. (a).....	Selkirk.....	
Hoover & Donald (a).....	Selkirk.....	
Houk Gas Syndicate.....	Dunnville.....	Moulton
House, C. C. (c).....	Stevensville.....	Bertie
Hussey, Wm. J. (a).....	Petrolia.....	
Ideal Gas Syndicate.....	R. R. 2, Fisherville.....	Rainham
Ivy Drilling Co. (a).....	Dunnville.....	
Jackson, Percy L. (c).....	Dunnville.....	Moulton, Canboro, Cayuga North, Walpole and Crowland
Jackson & Graff.....	Dunnville.....	Crowland
Jaspersen, Bon.....	Kingsville.....	Gosfield South and Romney
Jenkins, Stanley S.....	232 W. North St., Buffalo, N.Y., U.S.A.....	Townsend and Bertie
Kent Gas Co.....	36 Toronto St., Toronto.....	Walpole
Kerr, R.....	York.....	Seneca
Kiser Bros. (a).....	Chatham.....	
Lake Erie Gas Syndicate.....	54 Hambly Ave., Toronto.....	Rainham
Lake Shore Gas & Oil Syndicate.....	Stevensville.....	Bertie
Lauer, D. G. (a).....	Tillsonburg.....	
Leamington, Town of (b).....	Leamington.....	
Lincoln Natural Gas Co. Ltd.....	Fort Erie North.....	Canboro, Gainsboro, Wainfleet, Caistor and Moulton
Lindsay-McDougal Estate.....	279 St. George St., Toronto.....	Rainham
Little, R. W.....	222 Humbercrest Blvd., Toronto.....	Walpole, Rainham, Onondaga and Brant
Locators Oils Ltd.....	22 King St. W., Toronto.....	Cayuga South and Middleton
Lomac Gas Co.....	Port Stanley.....	Bayham
Lymburner Bros. & Webber (c).....	Dunnville.....	Cayuga North, Rainham and Walpole
Maple Leaf Gas Syndicate.....	Stevensville.....	Crowland and Humberstone
McCutcheon, T. J. (a).....	Dunnville.....	
McKeechie, S. (c).....	Dunnville.....	Senaca, Walpole and Bayham
McLister, J. J. (a).....	Dunnville.....	
McMaster, W. R. (a).....	Caledonia.....	
Mehlenbacher, L. B.....	R. R. 3, Cayuga.....	Senaca, Walpole and Cayuga North
Midfield Gas Corp. Ltd.....	68 Yonge St., Toronto.....	Cayuga North and Oneida
Minor & Luck.....	Cheltenham.....	Sherbrooke
Mohawk Gas & Oil Syndicate Ltd.....	421 Main St., Hamilton.....	Canboro, Oneida and Walpole
Monarch Gas & Oil Syndicate.....	Fisherville.....	Walpole, Dunn and Cayuga North
Morningstar, Roy.....	Stevensville.....	Bertie
Mott, G. L. & Associates (c).....	Lynden.....	Beverly
Nagel, E. (a).....	Stevensville.....	
Nelles Corners Gas Co.....	Hagersville.....	
Niagara Gas Syndicate.....	Fisherville.....	Rainham and Cayuga North
Niagara Natural Gas Co. Ltd.....	24 Jarvis St., Fort Erie North.....	Bertie
Niece, Elmond.....	Dunnville.....	Moulton
Norotto Gas Co. Ltd. (b).....	Norwich.....	Sherbrooke
North Cayuga Gas Syndicate.....	231 Rawson Rd., Brookline, Mass., U.S.A.....	Cayuga North
North Shore Gas Co.....	Selkirk.....	Rainham
Noyes, L. A.....	Stevensville.....	Willoughby
Oil Springs Oil & Gas Co. Ltd. (b).....	Oil Springs.....	
Oxford Pipe Line Co. (b).....	100 Adelaide St. W., Toronto.....	
Patterson & Culver (c).....	Dunnville.....	Oneida
Patterson, W. C., Gas Co. Ltd. (c).....	Jamestown, N.Y., U.S.A.....	Dunn, Walpole, Willoughby, Rainham, Cayuga North Crowland, Humberstone, Bayham, Dereham and Wainfleet
Peacock Point Gas & Oil Syndicate.....	Fisherville.....	Walpole
Perkins, J. E. (a).....	Dunnville.....	
Petrol Oil & Gas Co. Ltd.....	414 Bay St., Toronto.....	Dover, Oneida, Onondaga and Tuscarora
Pine Ridge Gas Co. Ltd.....	Port Stanley.....	Bayham
Port Colborne Welland Gas Co. (c).....	Port Colborne.....	Onondaga, Oneida, Senaca and Cayuga North

DIRECTORY OF FIRMS—Continued

Firms in the Natural Gas Industry in Canada—Continued

Name	Address	Location—Field
ONTARIO—Concluded		
Povec Gas Syndicate.....	Tillsonburg.....	Canboro
Prairie Gas & Oil Co. Ltd.....	350 Bay St., Toronto.....	Dover
Provincial Gas Co. Ltd.....	Fort Erie North.....	Humberstone, Willoughby, Bertie and Crowland
Pureifer & Ferguson.....	Stevensville.....	Humberstone
Rainham Gas Syndicate.....	Cayuga.....	Rainham
Reicheld, F. W.....	Jarvis.....	Walpole
Ricker, Arthur (c).....	Canboro.....	Canboro
Riley, J. V.....	162 Talbot St., Simcoe.....	Moulton
Rocks Mill Oil & Gas Syndicate.....	510 Huron & Erie Bldg., London.....	Norwich South
Romney Oil & Gas Co.....	18 Toronto St., Toronto.....	Tilbury East, Romney and Wainfleet
Roth, F. and H. (c).....	R. R. 9, Dunnville.....	Bertie and Dunn
Rowe, E. P. Estate.....	403 Atlas Bldg., 350 Bay St., Toronto.....	Bayham, Dover East, Middleton and Raleigh
Royal Gas Syndicate.....	Stevensville.....	Bertie
Salina Gas Co. Ltd.....	317 Queen St., Chatham.....	Tilbury East
Sandusk Gas Syndicate.....	Fisherville.....	Walpole
Sarnia Oil & Gas Co.....	350 Bay St., Toronto.....	Enniskillen and Sarnia
Shank Bros. (a).....	Rainham Centre.....	
Sherk & Carrothers.....	Sherkston.....	Humberstone
Sherk & Learn.....	Sherkston.....	Humberstone
Sherk & Nagel.....	Stevensville.....	Bertie
Sherk, Perry M.....	Sherkston.....	Humberstone
Shurr & Shank.....	R. R. 1, Jarvis.....	Rainham and Oneida
Sider, Andrew & Jesse.....	Stevensville.....	Bertie
Sider, Norman.....	Sherkston.....	Bertie and Humberstone
Smith & Ehde (c).....	R. R. 1, Lowbanks.....	Moulton
South Norwich Gas & Oil Syndicate.....	Norwich.....	Norwich South
Sparton Gas & Oil Syndicate.....	67 Yonge St., Toronto.....	Cayuga South
Springvale Gas & Oil Co. Ltd.....	Hagersville.....	Walpole
Standard Gas & Oil Syndicate.....	Fisherville.....	Rainham and Walpole
Stanley Gas Syndicate.....	922 Millwood Rd., Toronto.....	Walpole, Rainham and Sherbrooke
Star Gas Syndicate.....	Ridgeway.....	Bertie
Sterling Gas Co.....	Guelph.....	Walpole
Stevensville Natural Gas & Fuel Co.....	Stevensville.....	Bertie
Stewart, Elgin.....	R. R. 3, Jarvis.....	Walpole
Stewart & Stewart.....	R. R. 3, Jarvis.....	Walpole
Storm & Stewart.....	R. R. 1, Sherkston.....	Humberstone
Stover, F. H., and Associates.....	330 Bay St., Toronto.....	Dover and Raleigh
Stromwell Gas Co.....	Tillsonburg.....	Moulton
Stubble, H. H. (a).....	Chatham.....	
Sundy Gas Wells.....	Dunnville.....	Canboro
Superior Gas Syndicate.....	Fisherville.....	Rainham
Swayze & Nauman (a).....	R. R. 5, Simcoe.....	
Sweets Corners Gas Syndicate.....	Fisherville.....	Rainham
Swent, Wm. (a).....	Rainham Centre.....	
Tanner, F. O.....	135 General Motors Bldg., Detroit, Mich., U.S.A.....	Cayuga North and Oneida
Till Gas Syndicate.....	Tillsonburg.....	Walpole
Tillsonburg (New) Oil & Gas Co. Ltd.....	26 Adelaide St. W., Toronto.....	Middleton
Union Gas Co. of Canada Ltd.....	Chatham.....	Romney, Tilbury East, Raleigh, Dover, Dawn, Camden Gore, Zone, Mosa, Dunn, Cayuga North, Rainham, Seneca, Cayuga South, Walpole, Oneida, Chatham, Malahide, Westminster, Harwich and Brooke
United Gas & Fuel Co. of Hamilton Ltd. (b).....	82-84 King St. E., Hamilton.....	Rainham and Walpole
Victoria Gas Syndicate.....	Dunnville.....	Windham
Victory Oil & Gas Co.....	510 Huron & Erie Bldg., London.....	Wainfleet
Wainfleet Gas Co. Ltd.....	Box 914, Jamestown, N. Y., U.S.A.....	Wainfleet
Walpole Gas Syndicate.....	Cayuga.....	Walpole and Cayuga North
Walter Gas Syndicate Ltd. (c).....	Simcoe.....	Townsend, Walsingham South, Woodhouse, Middleton and Walpole
Welland County Gas Syndicate.....	Stevensville.....	Bertie
Wentworth Gas Co. Ltd. (b).....	82-84 King St. W., Hamilton.....	
West Petroleum Ltd.....	372 Bay St., Toronto.....	Romney
Western Ontario Natural Gas Co. Ltd.....	81 St. Paul St., St. Catharines.....	Canboro, Cayuga North, Dunn, Bayham and Dereham
Willoughby Gas Syndicate.....	R. R. 1, Chippawa.....	Humberstone
Windham Plantation Tobacco Co.....	Delhi.....	Windham
Wood, Ray.....	61 Inches Ave., Chatham.....	Mosa and Townsend
SASKATCHEWAN—		
Lloydminster Gas Co. Ltd.....	Lloydminster.....	Lloydminster
Northern Utilities Ltd.....	Lloydminster.....	Lloydminster

DIRECTORY OF FIRMS—Continued

Firms in the Natural Gas Industry in Canada—Concluded

Name	Address	Location—Field
ALBERTA—		
Ace Royalties Ltd.	4 Clarence Block, 122 8th Ave. W., Calgary.	Turner Valley
Advance Oil Co. Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Alberta Clay Products Co. Ltd.	Box 672, Medicine Hat.	Medicine Hat
Alberta Oil Incomes Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
Alberta Pacific Royalties Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Allied Royalties Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Amalgamated Oils Ltd.	902 Lancaster Bldg., Calgary.	Turner Valley
Anglo Canadian Oil Co. Ltd.	902 Lancaster Bldg., Calgary.	Turner Valley
Argus Royalties Ltd.	902 Lancaster Bldg., Calgary.	Turner Valley
Arrow Oil Royalties Ltd.	804 Southam Bldg., Calgary.	Turner Valley
Associated Oil & Gas Co. Ltd.	200 Leeson-Lineham Block, Calgary.	Turner Valley
Baltac Oils Ltd.	200 Leeson-Lineham Block, Calgary.	Turner Valley
Barsac Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary.	Turner Valley
Bow Island, Town of (b)	Bow Island.	
British American Oil Co. Ltd. (e)	Royal Bank Bldg., Toronto, Ont.	Turner Valley
British Colonial Oils Ltd.	1010 Lancaster Bldg., Calgary.	Bassano
Calgary Power Co. Ltd.	244 St. James St., Montreal, Que.	Conrad and Princess
California Standard Co.	700 Lancaster Bldg., Calgary.	Medicine Hat
Canadian Pacific Railway Co.	Medicine Hat.	
Canadian Western Natural Gas, Light, Heat & Power Co. Ltd.	215, 6th Ave. W., Calgary.	Brooks
Canadian Western Power & Fuel Co. Ltd.	Third St., Redcliff.	Redcliff
Coastal Oils Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
D & D Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary.	Turner Valley
Department of National Defence	Traders Bldg., Calgary.	Suffield
Dominion Glass Co. Ltd.	1111 Beaver Hall Hill, Montreal, Que.	Redcliff
East Crest Oil Co. Ltd.	212 Grain Exchange Bldg., Calgary.	Turner Valley
Foothills Oil & Gas Co. Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Gas & Oil Refineries Ltd. (e)	301 Lancaster Bldg., Calgary.	
Gunderson Brick & Coal Co. Ltd.	Redcliff.	Redcliff
Home Oil Co. Ltd.	226 Loughheed Bldg., Calgary.	Turner Valley
Hudson's Bay Oil & Gas Co. Ltd.	79 Main St., Winnipeg, Man.	Viking
Inland Gas & Oil Co. Ltd.	36 Dominion Bank Chambers, Edmonton.	Fabyan
Major Oil Investments Ltd.	407 Lancaster Bldg., Calgary.	Turner Valley
Maple Leaf Milling Co. Ltd.	Dominion Bank Bldg., Toronto 2, Ont.	Medicine Hat
Maple Leaf Oil Co. Ltd.	608 Stock Exchange Bldg., Vancouver, B.C.	Wainwright
Medicine Hat, City of.	Medicine Hat.	Medicine Hat
Medicine Hat Brick & Tile Co. Ltd.	Box 100, Medicine Hat.	Medicine Hat
Model Oils Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Northwestern Utilities Ltd.	10124, 104 St., Edmonton.	Viking and Kinsella
Ogilvie Flour Mills Co. Ltd.	Medicine Hat.	Medicine Hat
Oil Ventures Ltd.	501 Leeson-Lineham Bldg., Calgary.	Turner Valley
Pacific Petroleum Ltd.	501 Leeson-Lineham Bldg., Calgary.	Turner Valley
Redcliff Pressed Brick Co. Ltd.	Redcliff.	Redcliff
Royalite Oil Co. Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Suffield Gas Supply	Suffield.	Suffield
Sunset Oils Ltd.	302 Toronto General Trusts Bldg., Calgary.	Turner Valley
Turner Valley Royalties Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Valley Gas Co. Ltd.	Turner Valley.	Turner Valley
Vanalta Ltd.	618-744 West Hastings St., Vancouver, B.C.	Red Coulee
Wainwright Gas Co. Ltd. (b)	36 Dominion Bank Chambers, Edmonton.	
Welch, Nora M.	Suffield.	Medicine Hat
Wetaskiwin, City of.	Wetaskiwin.	Wetaskiwin
York Oils Ltd.	501 Leeson-Lineham Block, Calgary.	Turner Valley
NORTHWEST TERRITORIES—		
Imperial Oil Co. Ltd.	56 Church St., Toronto, Ont.	Fort Norman

Crude Oil Producers in Canada

NEW BRUNSWICK—		
New Brunswick Gas & Oilfields Ltd.	Moncton.	Stoney Creek
ONTARIO (*)—		
Barnes, Amos.	Petrolia.	Petrolia and Enniskillen
Barnes, Henry.	Oil Springs.	Petrolia and Enniskillen
Beattie, James and John.	Glencoe.	Warwick
Brock, Thomas.	Petrolia.	Petrolia and Enniskillen
Byers Bros.	Oil Springs.	Petrolia and Enniskillen
Cole, W. J.	Petrolia.	Petrolia and Enniskillen
Collins, Matthew.	Petrolia.	Petrolia and Enniskillen
Corey Oil & Supply Co.	Petrolia.	Petrolia and Enniskillen
Dennis, Lavinia.	Oil Springs.	Petrolia and Enniskillen
Domestic Gas & Oil Co. Ltd.	Blyth.	Bothwell
Dominion Petroleum Co.	Glencoe.	Mosa
Donald, George.	Oil Springs.	Petrolia and Enniskillen
Eastern Trust Co.	Toronto.	Dunwich
Edward, F. H.	Petrolia.	Petrolia and Enniskillen
Fairbank, John H., Estate.	Petrolia.	Petrolia and Enniskillen

DIRECTORY OF FIRMS—Continued

Crude Oil Producers in Canada—Continued

Name	Address	Location—Field
ONTARIO—Concluded		
Fitzpatrick, P. H.	2230 Park Ave., Detroit, Mich., U.S.A.	Orford
Garinger, Arthur	Oil Springs	Petrolia and Enniskillen
Graff, George I.	25 Market Place, Stratford	Bothwell
Hamlin, F. G.	Petrolia	Petrolia and Enniskillen
Heal, Andrew A.	Watford	Warwick
High Grade Natural Gas Co.	215 King St., Chatham	Dover
Hillis, F. E.	Oil Springs	Petrolia and Enniskillen
Holmes, E. B. (†)	Bothwell	Bothwell
Howlett, F. W. & Sons	Petrolia	Petrolia and Enniskillen
Kells, E. E.	Petrolia	Petrolia and Enniskillen
Kelly, J. E.	Petrolia	Petrolia and Enniskillen
Kent Oil Syndicate	Bothwell	Bothwell
Kerr, John, Estate	Petrolia	Petrolia and Enniskillen
Lather, Arthur	Bothwell	Bothwell
Lennan, L. A.	Box 514, Petrolia	Petrolia and Enniskillen
Leverton, Wm.	Bothwell	Bothwell
Lewis, Laura and William	Oil Springs	Petrolia and Enniskillen
Lidster, Harold	Wallacetown	Dunwich
Longwood Syndicate	Chatham	Zone
MacGillivray, Mrs. Margaret A.	Oil Springs	Petrolia and Enniskillen
Marcus, A.	Bothwell	Bothwell
McCutcheon, A. P.	Oil Springs	Petrolia and Enniskillen
McGill, Joseph	Bothwell	Bothwell
McMillan, Duncan C.	Bothwell	Bothwell
McMillan & Warwick	Bothwell	Bothwell
Mitchell, Charles	Oil Springs	Petrolia and Enniskillen
Mitchell, Robert	Oil Springs	Petrolia and Enniskillen
Morningstar, George E.	Oil Springs	Petrolia and Enniskillen
Morningstar, H. M.	Oil Springs	Petrolia and Enniskillen
Ontario Lands & Oil Co.	Petrolia	Petrolia and Enniskillen
Petrol Oil & Gas Co.	414 Bay St., Toronto	Dover
Pope, Harry O.	Bothwell	Bothwell
Pope, William Jr.	Bothwell	Bothwell
Prairie Gas & Oil Co.	350 Bay St., Toronto	Dover
Rowe, E. P., Estate	350 Bay St., Toronto	Dover and Raleigh
Saroline Oil Co.	Petrolia	Petrolia and Enniskillen
Shain, Viola May	R.R. 3, Petrolia	Petrolia and Enniskillen
Slack, Charles	Box 863, Petrolia	Petrolia and Enniskillen
Sutherland, Bloss M.	Petrolia	Petrolia and Enniskillen
Thompson, Arnold	Petrolia	Petrolia and Enniskillen
Tunks, James	Bothwell	Bothwell
Union Gas Co. of Canada Ltd.	Gas Bldg., Fifth St., Chatham	Dawn, Raleigh and Zone
Warwick, Joseph	Oil Springs	Petrolia and Enniskillen
Wilson & Sullivan	Sarnia	Adelaide, Brooke and Warwick
Winnett, J. W. G.	418½ Talbot St., London	Bothwell and Warwick
Woodward, Wm.	Oil Springs	Petrolia and Enniskillen
Yerks, Frank	Petrolia	Petrolia and Enniskillen and Warwick
ALBERTA—		
Abasand Oils Ltd.	Credit Foncier Bldg., Edmonton	Fort McMurray
Ace Royalties Ltd.	4 Clarence Block, 122-8th Ave., Calgary	Turner Valley
Advance Oil Co. Ltd.	232 Loughheed Bldg., Calgary	Turner Valley
Alberta Oil Incomes Ltd.	301 Lancaster Bldg., Calgary	Turner Valley
Alberta Pacific Royalties Ltd.	201 Lancaster Bldg., Calgary	Turner Valley
Allied Royalties Ltd.	201 Lancaster Bldg., Calgary	Turner Valley
Amalgamated Oils Ltd.	902 Lancaster Bldg., Calgary	Turner Valley
Anglo Canadian Oil Co. Ltd.	902 Lancaster Bldg., Calgary	Turner Valley
Argus Royalties Ltd.	900 Lancaster Bldg., Calgary	Turner Valley
Arrow Oil Royalties Ltd.	804 Southam Bldg., Calgary	Turner Valley
Associated Oil & Gas Co. Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley
Baltic Oils Ltd.	200 Leeson-Lineham Block, Calgary	Turner Valley
Barsac Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary	Turner Valley
Bethwain Oils Ltd.	73 Adelaide St. W., Toronto, Ont.	Wainwright
Borradaile Oils Ltd.	330 Bay St., Toronto, Ont.	Vermilion
British American Oil Co. Ltd. (b).	Royal Bank Bldg., King & Yonge Sts., Toronto, Ont.	
British Colonial Oils Ltd.	1010 Lancaster Bldg., Calgary	Turner Valley
British Dominion Oil & Development Corp. Ltd.	213-216 Dominion Bank Bldg., Calgary	Turner Valley
British Empire Oil & Development Co. Ltd.	401 Leeson-Lineham Block, Calgary	Turner Valley
California Standard Co.	700 Lancaster Bldg., Calgary	Conrad and Princess
Calmont Oils Ltd.	303 Toronto General Trusts Bldg., Calgary	Turner Valley
Calwin Royalties Ltd.	301 Lancaster Bldg., Calgary	Turner Valley
Canadian Transport Ltd.	Vermilion	Vermilion
Cannar Oils Ltd.	360 McGill St., Montreal, Que.	Vermilion
Carleton Royalties Ltd.	102 Bank of Commerce Chambers, Calgary	Turner Valley
Chinook Oils Ltd.	232 Loughheed Bldg., Calgary	Turner Valley
Coastal Oils Ltd.	232 Loughheed Bldg., Calgary	Turner Valley
Command Oils Ltd.	4 Clarence Block, 122-8th Ave. W., Calgary	Turner Valley

(*) Producers of 300 barrels or more during the year.

(†) Producer and driller.

DIRECTORY OF FIRMS—Continued

Crude Oil Producers in Canada—Concluded

Name	Address	Location—Field
ALBERTA—Concluded		
Commoil Ltd.	4 Clarence Block, 122-8th Ave. W., Calgary.	Turner Valley
Commonwealth Drilling Co. Ltd. (a)	4 Clarence Block, 122-8th Ave. W., Calgary.	
Conestoga Resources Ltd.	710 Excelsior Life Bldg., Toronto, Ont.	Vermilion
Crest Royalties Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Crude Oils Ltd.	501 Leeson-Lineham Bldg., Calgary.	Turner Valley
D & D Royalties Ltd.	303 Toronto General Trusts Bldg., Calgary.	Turner Valley
Dalhousie Oil Co. Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Davies Petroleum Ltd. N.P.L.	409 Lancaster Bldg., Calgary.	Turner Valley
Deep Oils Ltd.	501 Leeson-Lineham Bldg., Calgary.	Turner Valley
Dominion Oil Co. Ltd.	906 Marine Bldg., Vancouver, B.C.	Taber
Drillers & Producers Ltd.	337-8th Ave. W., Calgary.	Turner Valley
East Crest Oil Co. Ltd.	212 Grain Exchange Bldg., Calgary.	Turner Valley
Edmonton-Wainwright Oils Ltd.	8 McDougall Court, Edmonton.	Wainwright
Extension Oil Royalties Ltd.	902 Lancaster Bldg., Calgary.	Turner Valley
Federated Petroleum Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Foothills Oil & Gas Co. Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Four Star Petroleum Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Franco Oils Ltd.	Vermilion.	Vermilion
Gas & Oil Refineries Ltd. (b)	301 Lancaster Bldg., Calgary.	
Gem Royalties Ltd.	403 Lancaster Bldg., Calgary.	Turner Valley
Granville Oils Ltd.	4 Clarence Block, 122-8th Ave. W., Calgary.	Turner Valley
Great Bend.	National Trust Bldg., Edmonton.	Vermilion
Harris Co. Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Highwood-Sarcee Oils Ltd.	614 Lancaster Bldg., Calgary.	Turner Valley
Hollingsworth Oils Ltd.	210 Toole Peet Bldg., Calgary.	Vermilion
Home Oil Co. Ltd.	226 Loughheed Bldg., Calgary.	Turner Valley
Imperial Oil Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Independent Royalties Ltd.	403 Lancaster Bldg., Calgary.	Turner Valley
Kamaltas Well Operators Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Lion Producing Co. Ltd.	328A, 8th Ave. W., Calgary.	Turner Valley
Major National Oils Ltd.	407 Lancaster Bldg., Calgary.	Turner Valley
Major Oil Ltd.	403 Lancaster Bldg., Calgary.	Taber
Major Oil Investments Ltd.	407 Lancaster Bldg., Calgary.	Turner Valley
McDougall-Segur Exploration Company of Canada Ltd.	405-8th Ave. W., Calgary.	Turner Valley
Mercury Oils Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
Miracle Oils Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
Miracle Royalties Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
Model Oils Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Moose Oils Ltd.	714 Lancaster Bldg., Calgary.	Moose Dome
National Drilling Co. Ltd.	401 Leeson-Lineham Bldg., Calgary.	Turner Valley
National Petroleum Corp.	401 Leeson-Lineham Bldg., Calgary.	Turner Valley
National Vulcan Royalties.	401 Leeson-Lineham Bldg., Calgary.	Turner Valley
Newell & Chandler Ltd. (a)	337-8th Ave. W., Calgary.	
Northclonnel Royalties Ltd.	330 Bay St., Toronto, Ont.	Turner Valley
Oil Ventures Ltd.	501 Leeson-Lineham Block, Calgary.	Turner Valley
Okalta Oils Ltd.	Renfrew Bldg., Calgary.	Turner Valley
Pacific Petroleum Ltd.	501 Leeson-Lineham Block, Calgary.	Turner Valley
Princerville Petroleum Ltd.	720 Stock Exchange Bldg., Vancouver, B.C.	Vermilion
Ram River Oils Ltd.	728 Tegler Bldg., Edmonton.	Ram River
Regal Royalties Ltd.	401 Leeson-Lineham Block, Calgary.	Turner Valley
Renown Royalties Ltd.	201 Lancaster Bldg., Calgary.	Turner Valley
Reward Spooner Model Ltd.	717 Lancaster Bldg., Calgary.	Turner Valley
Royal Canadian Oils Ltd.	403 Lancaster Bldg., Calgary.	Turner Valley
Royal Crest Petroleum Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Royalite Oil Co. Ltd. (c)	604-606 Second St. W., Calgary.	Turner Valley
Royalite Model No. 1 Well.	201 Lancaster Bldg., Calgary.	Turner Valley
Saskatchewan Oils Ltd.	Indian Head, Sask.	Vermilion
Sasko-Wainwright Oil & Gas Ltd.	103 Bowerman Bldg., Saskatoon, Sask.	Wainwright
Share Royalties Ltd.	61 Canada Life Bldg., Calgary.	Turner Valley
Shaw, R. L.	Box 37, Lloydminster, Sask.	Lloydminster
Southwest Petroleum Co. Ltd.	604-606 Second St. W., Calgary.	Turner Valley
Sovereign Royalties Ltd.	317 Alberta Corner, Calgary.	Turner Valley
Standard Oil Company of British Columbia Ltd.	906 Marine Bldg., Vancouver, B.C.	Taber
Sunburst Oil Co. Ltd.	800 Lancaster Bldg., Calgary.	Turner Valley
Sunset Oils Ltd.	302 Toronto General Trusts Bldg., Calgary.	Turner Valley
Three Point Petroleum Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Turner Valley Royalties Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Twin Valley Oil Royalties Ltd.	804 Southam Bldg., Calgary.	Turner Valley
United Assets Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Vanalta Ltd.	618-744 West Hastings St., Vancouver, B.C.	Red Coulee
Vanpeg Royalties Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
Vulcan-Brown Petroleum Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Wain-Con Oils Ltd.	431 Tegler Bldg., Edmonton.	Wainwright
Wainwright Petroleum Ltd.	10625, 99 Ave., Edmonton.	Wainwright
Western Petroleum Operators Ltd.	407 Lancaster Bldg., Calgary.	Turner Valley
Westside Royalties Ltd.	232 Loughheed Bldg., Calgary.	Turner Valley
Winalta Royalties Ltd.	301 Lancaster Bldg., Calgary.	Turner Valley
York Oils Ltd.	501 Leeson-Lineham Block, Calgary.	Turner Valley
NORTHWEST TERRITORIES—		
Imperial Oil Ltd. (Canol Project)	56 Church St., Toronto, Ont.	Fort Norman
Imperial Oil Ltd. (Norman Wells)	56 Church St., Toronto, Ont.	Fort Norman

(a) Drilling only.

(b) Operates an absorption plant.

(c) In addition to operating and drilling wells in the Turner Valley field, this company operates an absorption plant.

OTHER NON-METAL MINING INDUSTRIES

DIRECTORY OF FIRMS—Continued

Asbestos Mining Industry

Name of firm	Head or general office address	Location of plant
QUEBEC— Asbestos Corporation Ltd.....	Thetford Mines.....	Thetford Mines, Black Lake, Coleraine
Bell Asbestos Mines Ltd.....	Thetford Mines.....	Thetford Tp.
Canadian Johns-Manville Co. Ltd.....	Sun Life Bldg., Montreal.....	Asbestos
Flintkote Mines Ltd. (*).....	283 Roxborough St. E., Toronto, Ont.....	Thetford Mines
International Asbestos Co. Ltd. (*).....	66 Wellington St. N., Sherbrooke.....	St. Adrien de Ham
Johnson's Company.....	Thetford Mines.....	Thetford Mines, Coleraine
Nicolet Asbestos Mines Ltd.....	820 Transportation Bldg., Montreal.....	Norbestos
Quebec Asbestos Corp. Ltd.....	East Broughton Station.....	East Broughton Station

(*) Carried on exploration or development work only.

Feldspar and Quartz Mining Industry

- | | |
|---------------------------|---------------------------------|
| (a) Produces silica. | (e) Produces nepheline syenite. |
| (b) Produces feldspar. | (f) Produces grinding pebbles. |
| (c) Operates a mill. | (g) Contractor. |
| (d) Also produces kaolin. | (h) Produces scapolite. |

Name of firm	Head office address	Location of mine or mill
NOVA SCOTIA— Nairn, J. (a).....	24 Whitney Ave., Sydney.....	Leitches Creek
Stevens, Archie (a).....	11 McKenzie St., Glace Bay.....	Melford
QUEBEC— Bigelow, Gordon (b) (g).....	Glen Almond.....	Derry Tp.
Bon Ami Ltd., (b) (c).....	13719 Notre Dame St. E., Montreal.....	Montreal
Couture, T. (f).....	Glen Almond.....	Glen Almond
Canadian Carborundum Co. Ltd., (a) (c).....	Box 57, Niagara Falls, Ont.....	St. Canut
Canada China Clay & Silica Ltd. (a) (d).....	1600 Royal Bank Bldg., Toronto, Ont.....	Amherst Tp.
Canadian Flint & Spar Co. Ltd. (a) (b) (c).....	Room 512 Victoria Bldg., Ottawa, Ont.....	Buckingham
Excavators (Rock) Ltd. (a) (g).....	Noranda.....	Lac Bouchette
Hart, Rodrigue (a).....	Notre Dame de la Salette.....	Portland W. Tp.
Hill, Wm. (a) (f).....	Glen Almond.....	Buckingham Tp.
Industrial Silica Corp. (a).....	Room 408—266 St. James St., Montreal.....	Roberval Co.
Lafrance, Ovila (a).....	Angers.....	Buckingham Tp.
Law, S. H. (a) (b).....	Room 28, 14 Toronto St., Toronto, Ont.....	Derry Tp.
Micaspar Industries Ltd. (b).....	16 James St. S., Hamilton, Ont.....	Portland W. Tp.
McGill, Lawrence (h).....	R.R. No. 1, Pointe au Chene.....	Grenville Tp.
Montpetit, Euclide (a).....	Melochville.....	Beauharnois Co.
Morin, A. H. (a) (b).....	Box 3, Buckingham.....	Buckingham Tp.
Parcher, Earl (b).....	Glen Almond.....	Portland E. Tp.
St. Lawrence Alloys & Metals Ltd. (a) (c).....	Beauharnois.....	Beauharnois Co.
United Mining Industries Ltd. (a) (b).....	1451 Notre Dame St. W., Montreal.....	Buckingham
ONTARIO— American Nepheline Corp. (e).....*	Lakefield.....	Methuen Tp.
Bancroft Mica & Stone Products (b) (c).....	Bancroft.....	Faraday Tp.
Bathurst Feldspar Mines Ltd. (b).....	Room 508, 21 King St. E., Toronto.....	Bathurst Tp.
Buffalo Ankerite Gold Mines Ltd. (f).....	Box 533, South Porcupine.....	Deloro Tp.
Canspar Mines Ltd. (b).....	100 Adelaide St. W., Toronto.....	Bathurst Tp.
Craig, T. H. (b).....	Perth.....	Bathurst Tp.
Dominion Mines & Quarries Ltd. (a) (c).....	Canada Life Bldg., Toronto.....	Killarney
Frontenac Floor & Wall Tile Co. Ltd. (b) (c).....	Kingston.....	Kingston
International Nickel Co. of Canada Ltd. (a).....	Copper Cliff.....	Lawson Tp.
Kingston Silica Mines Ltd. (a) (c).....	R.R. No. 1, Kingston.....	Pittsburg Tp.
Keystone Contractors Ltd. (a) (b) (c).....	732 Langlois Ave., Windsor.....	Murchison Tp.
Madawaska Feldspar Co. (a) (b).....	275 St. James St., Montreal.....	Murchison Tp.
Manitoulin Quartzite Co. (a) (c).....	732 Langlois Ave., Windsor.....	Manitoulin Island
Quartz Crystals Mining Co. of Canada Ltd. (a).....	712 Federal Bldg., Toronto.....	Lansdowne Tp.
Verona Rock Products Ltd. (a) (b).....	330 Bay St., Toronto.....	Verona
Wright and Co. (a) (c).....	960 Queen St., Sault Ste. Marie, Ont.....	Deroche Tp.
BRITISH COLUMBIA— Consolidated Mining & Smelting Co. of Canada Ltd. (a).....	Trail.....	Grand Forks

DIRECTORY OF FIRMS—Continued

Firms in the Gypsum Mining Industry

Name of firm	Head office address	Plant location
NOVA SCOTIA—		
Canadian Gypsum Co. Ltd.....	170 Bloor St. W., Toronto, Ont.....	Wentworth
Conn. Adamant Plaster Co.....	10 River St., New Haven, Conn., U.S.A.....	Cheverie
Gypsum, Lime & Alabastine, Canada, Ltd.		
(*).....	Paris, Ont.....	Baddeck Bay
National Gypsum (Canada) Ltd.....	325 Delaware Ave., Buffalo, N.Y.....	Walton, Dingwall, Cheticamp
Victoria Gypsum Co. Ltd.....	Little Narrows.....	Little Narrows
Windsor Plaster Co. Ltd.....	Windsor.....	Brooklyn, Hants Co.
NEW BRUNSWICK—		
Canadian Gypsum Co. Ltd.....	170 Bloor St. W., Toronto, Ont.....	Hillsborough
ONTARIO—		
Canadian Gypsum Co. Ltd.....	170 Bloor St. W., Toronto.....	Hagersville
Cayuga Gypsum Co. Ltd.....	Caledonia.....	North Cayuga Tp.
Gypsum, Lime & Alabastine, Canada, Ltd....	Paris.....	Caledonia
MANITOBA—		
Gypsum, Lime & Alabastine, Canada, Ltd....	Paris, Ont.....	Gypsumville
Western Gypsum Products Ltd.....	503 McArthur Bldg., Winnipeg.....	Amaranth
BRITISH COLUMBIA—		
Gypsum, Lime & Alabastine, Canada, Ltd....	Paris, Ont.....	Falkland

(*) Idle 1944.

Firms in the Iron Oxide Mining Industry

Name of firm	Head office address	Location of plant or mine
QUEBEC—		
Argall, Mrs. Thomas H.....	630 Ste. Angèle, Trois Rivières.....	Pointe du Lac
Girardin, Chas. D.....	Yamachiché.....	Almaville en Haut
Lafranière, Philias.....	St. Louis de France.....	St. Louis de France
Mauricy Oxide Co.....	259, 6th Ave., Grand'Mère.....	St. Adelphe Co.
The Sherwin-Williams Co. of Canada Ltd.		
(*).....	2875 Centre St., Montreal.....	Red Mill, Champlain Co.
BRITISH COLUMBIA—		
Davidson, J. G.....	346 Surfton Place, La Jolla, California, U.S.A.....	Alta Lake

(*) Produce refined grades.

Operators in the Canadian Mica Mining Industry

(*) Active, but no shipments made.
(a) Markets dressed mica.(b) Operates a grinding mill.
(c) Mines muscovite mica.

Name of operator	Head office address	Location of mine or plant
QUEBEC—		
Blackburn Bros. Ltd. (a) (b).....	Blackburn Bldg., Ottawa, Ont.....	Cantley and Perkins Mills
Blood, A. P. (a).....	635 Greenwich St., New York 14, N.Y.....	Denholm Tp.
Charbonneau, Regina.....	Perkins.....	Perkins
Charbonneau, N.....	Perkins.....	Perkins
Charbonneau, Hector.....	Perkins.....	Perkins
Chenier, Z. E.....	Rockland, Ont.....	Grenville Tp.
Constantineau, Marguerite (a).....	Pointe au Chêne.....	Grenville Tp.
Cross, Walter C. (a).....	209 Bridge St., Hull.....	Hull Tp.
Cross, Leslie B.....	Cascades.....	Cascades
Delisle, Jos.....	Mistassini.....	Hudon Tp.
Gagne, Louis.....	St. Michel de Wentworth.....	Argenteuil Co.
Girouard, Edmond.....	Perkins.....	Perkins
Marier, Louis (a) (c).....	Huberdeau.....	Argenteuil Co.
Mica Laurentian Ltd. (c).....	Box 189, Hull.....	Bergeronnes Tp.
Mineault, Claude.....	Perkins.....	Papineau Co.
McLaurin Mica Ltd. (a).....	Aldred Bldg., Montreal.....	Cantley
Mica Company of Canada Ltd. (a).....	Hull.....	Hull
Perkins Mining Co.....	Pointe Gatineau.....	Templeton Tp.

DIRECTORY OF FIRMS—Continued

Operators in the Canadian Mica Mining Industry—Concluded

(*) Active, but no shipments made.
(a) Markets dressed mica.

(b) Operates a grinding mill.
(c) Mines muscovite mica.

Name of operator	Head office address	Location of mine or plant
QUEBEC—Concluded		
Palement, B.	Perkins	Perkins
Poirier, A. (a)	Wilson's Corner	Wilson's Corner
Rainville, Paul de	Perkins	N. Templeton Tp.
Renaud, J.	Perkins	Perkins
Sabourin, V.	Perkins	Perkins
Severin, J.	3452 Shuter St., Montreal	Charlevoix Co.
Simard, E. (c)	Bergeronnes	Bergeronnes
Sigouin, Frank (a) (c)	Bourmont, via Monet	Abitibi Dist.
Teegee Ltd. (a)	Room 1201 Royal Bank Bldg., Montreal	Montreal
Thompson, Wm. E.	Cantley	Cantley
Trudeau, Wm. (a)	Old Chelsea	Old Chelsea
Victory Mines (a)	517 Booth St., Ottawa, Ont.	W. Hull Tp.
Wallingford, W. M. (a)	Pointe Gatineau	Templeton Tp.
Wallingford, John H.	Perkins	Perkins
Wallingford, E., Ltd.	Perkins	Templeton Tp.
Wallingford, J. N.	Glen Almond	Glen Almond
White, A. W., Mica Ltd. (a)	Room 407, 67 Yonge St., Toronto, Ont.	Notre Dame du Laus
Wilson, Wm. S.	Cascades	Thorne Tp.
ONTARIO—		
Bancroft Mica & Stone Products	c/o S. H. Orser, Bancroft	Bancroft
Cross, Walter C. (Finlan) (c)	209 Bridge St., Hull, Que.	Davis Tp.
Kingston Mica Mining Co. Ltd.	Godfrey	Godfrey
Lee, W. W. (a)	R.R. 1, Perth Road	Perth Road
Loughborough Mining Co. Ltd. (a)	Sydenham	Sydenham
Marston Minerals Ltd. (a) (c)	Drawer 214, Madoc	Effingham Tp.
Micaspar Industries Ltd. (a)	16 James St. S., Hamilton	Loughborough Tp.
Orser and Smith (a)	c/o J. L. Smith, Cataraqui	Bedford Tp.
Purdy Mica Mines Ltd. (a) (c)	North Bay	Eau Claire
Verona Rock Products Ltd.	Verona	Verona
Watts, R. W. (a)	Perth	Perth
BRITISH COLUMBIA—		
Fairey & Co. (b)	661 Taylor St., Vancouver	Vancouver
McKay, R. C.	Oliver	Similkameen Dist.
Richmond, Geo. W. (b)	4190 Blenheim St., Vancouver	Vancouver

Firms in Canadian Peat Industry

(*) Active but no shipment made.
(a) Produces moss.

(b) Produces peat fuel.
(c) Produces humus.

(d) Inactive in 1944.

Name of firm	Head office address	Location of bog or plant
NEW BRUNSWICK—		
Fofard Peat Moss Co. (a)	Shippegan	Shippegan
Western Peat Co. Ltd. (*)	Box 699, New Westminster, B.C.	Shippegan
QUEBEC—		
Beausejour Peat Moss (a)	St. Romald	St. Lambert
Bourque & Fils (a)	St. Marc des Carrières	St. Marc des Carrières
Canada Peat Ltd. (a)	303A rue Lafontaine, Rivière-du-Loup	St. Antonin
Demers & Godbout (*)	Senneterre	Abitibi
Excel Peat Ltd. (a)	319 rue Lafontaine, Rivière-du-Loup	Isle aux Coudres
Maple Leaf Peat Ltd. (a)	303A rue Lafontaine, Rivière-du-Loup	St. Antonin
Premier Peat Moss Ltd. (a)	Isle Verte	Isle Verte
Perfect Peat Products (a)	303A rue Lafontaine, Rivière-du-Loup	St. Antonin
Quebec Peat Moss Co. (a) (b)	St. Guillaume d'Upton	St. Bonaventure
Reid, Roy F. (a)	Waterville	Waterville
Roy, Romeo, (a)	St. Ulric	St. Ulric
Roy, Louis (a)	Rivière Blanche	Rivière Blanche
Saguenay Peat Moss Co. Ltd. (a)	187 Jacques Cartier, Chicoutimi	Bagot Tp.
Tourbières Rivière-Ouelle (a)	2 Côte d'Abraham, Quebec	Rivière Ouelle
Tourbière de St. André Ltée (b)	St. André de Kam.	St. André de Kam.
Tourbière de Pointe-au-Père (a) (b)	Mont Joli	Pointe au Père
Tourbière de Grondines (*) (b)	Grondines	Grondines
Tourbière Ste. Brigitte (b)	Ste. Brigitte d'Iberville	Ste. Brigitte d'Iberville
Tourbe Combustible (b)	Rivière-du-Loup	Withworth Tp.

DIRECTORY OF FIRMS—Continued

Firms in Canadian Peat Industry—Concluded

(*) Active but no shipments made.

(b) Produces peat fuel.

(a) Produces moss.

(c) Produces humus.

(d) Inactive in 1944.

Name of firm	Head office address	Location of bog or plant
ONTARIO—		
Arctic Peat Moss Corp. Ltd. (a).....	200 Sterling Securities Bldg., Winnipeg, Man.	Crozier
Canadian Humus Products (c).....	Suite 1010, 100 Adelaide St. W. Toronto.....	Beverley Tp.
Canadian Industries Ltd. (c).....	1135 Beaver Hall Hill, Montreal, Que.....	Harwich Tp.
Erie Peat Ltd. (a).....	Box 500, Port Colborne.....	Wainfleet Tp.
Leasa Peat Works (a) (b).....	106 Britannia St., Stratford.....	Ellice Tp.
Polar Bear Peat Moss Products (a).....	Fort Frances.....	Pinewood
MANITOBA—		
Winnipeg Supply & Fuel Co. Ltd. (a).....	812 Boyd Bldg., Winnipeg.....	Shelley
BRITISH COLUMBIA—		
Alouette Peat Products Ltd. (a).....	Pitt Meadows.....	Pitt Meadows
B.C. Peat Company Ltd. (a).....	302 Royal Bank Bldg., Vancouver.....	Ladner
Byrnerood Peat Farm (a).....	2707 McKay Ave., New Westminster.....	Burnaby
Coast Peat Co. Ltd. (a).....	736 Granville St., Vancouver.....	Burnaby
Columbia Products Ltd. (a).....	Box 699, New Westminster.....	Lulu Island
Commercial Peat Co. Ltd. (d).....	R. R. 2, Eburne.....	
Excelsior Peat Ltd. (a).....	6633 Yew St., Vancouver.....	Burnaby
Industrial Peat Co. (a).....	Box 329 New Westminster.....	Delta Municipality
Lulu Island Peat Co. Ltd. (a).....	R. R. 2, Eburne.....	Richmond Tp.
Northern Peat Moss Co. Ltd. (a).....	R. R. 2, Eburne.....	Richmond Tp.
Pacific Peat Products Ltd. (a).....	814 Hall Bldg., Vancouver.....	New Westminster
Western Peat Co. Ltd. (a).....	Box 699, New Westminster.....	Lulu Island

Canadian Salt Producing Firms

Name of firm	Head or executive office	Location of plant
NOVA SCOTIA—		
Malagash Salt Co. Limited.....	196 Provost St., New Glasgow.....	Cumberland Co.
ONTARIO—		
Brunner, Mond Canada, Ltd.....	Canadian Bank of Commerce Bldg., Toronto	Essex Co.
Canadian Industries Limited.....	Box 10, Montreal, Que.....	Essex Co.
Goderich Salt Co. Ltd.....	Box 577, Goderich.....	Goderich
Sifto Salt Co. Ltd.....	2240 Sun Life Bldg., Montreal, Que.....	Sarnia
Warwick Pure Salt Co. Ltd.....	R. R. 5, Watford.....	Lambton Co.
Purity Flour Mills Ltd.....	287 MacPherson Ave., Toronto.....	Goderich
MANITOBA—		
Canadian Industries Ltd.....	Box 10, Montreal, Que.....	Neepawa
ALBERTA—		
Industrial Minerals Ltd.....	2240 Sun Life Bldg., Montreal, Que.....	Waterways

The Talc and Soapstone Industry

Name of firm	Head office address	Location of plant or mine
QUEBEC—		
Baker Mining & Milling Co. Ltd.....	4010 St. Catherine St. W., Montreal.....	Highwater
Broughton Soapstone & Quarry Co. Ltd.....	Broughton Station.....	Broughton Station
Fortin, Charles.....	Robertsonville.....	Thetford Tp.
Pharo, L. C. Co. Ltd.....	187 St. Maurice St., Thetford Mines.....	Leeds Tp.
ONTARIO—		
Canada Talc Limited.....	Madoc.....	Huntingdon Tp.
BRITISH COLUMBIA—		
Wartime Metals Corp. (*).....	637 Craig St. W., Montreal, Que.....	Kootenay National Park

MISCELLANEOUS NON-METAL MINING INDUSTRIES IN CANADA

(*) Active but not producing.

Barite

Name of operator, province and product	Head office address	Plant location
NOVA SCOTIA— Canadian Industrial Minerals Ltd.....	Walton, N.S.....	Walton
BRITISH COLUMBIA— Summit Lime Works Ltd..... Thrall, Ralph A.....	Box 273, Lethbridge, Alta..... Box 273, Lethbridge, Alta.....	Golden M.D. Golden M.D.

Brucite

QUEBEC— Aluminum Company of Canada Ltd.....	Sun Life Building, Montreal.....	Wakefield
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Corundum

ONTARIO— Wartime Metals Corp.....	637 Craig St. W., Montreal, Que.....	Raglan Tp.
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Diatomite

NOVA SCOTIA— G. W. Wightman (Mrs.).....	Smith's Cove, N.S.....	Digby Co.
BRITISH COLUMBIA— Fairey and Co.....	661 Taylor St., Vancouver.....	Cariboo M.D. Vancouver

Fluorspar

NOVA SCOTIA— Papke, William.....	Trout River, N.S.....	Inverness Co.
QUEBEC— Twin Valley Prospecting Synd.....	529 Besserer St., Ottawa.....	Huddersfield Tp.
ONTARIO— Basset Fluorspar Mining Synd. Ltd..... Detomac Mines Ltd..... Fluoroc Mines Ltd. (*)..... Gilman, R. T..... Millwood Fluorspar Mines Ltd..... Montgomery, J. K..... Reliance Fluorspar Mining Synd. Ltd..... Stocklosar, Chas. A..... Tops Mining Synd. Ltd. (*).....	Room 908, 36 Toronto St., Toronto..... 805 Northern Ontario Bldg., Toronto..... Box 220, Trenton..... 13 Govt. Road W., Kirkland Lake..... Box 206, Madoc..... Havelock..... Madoc..... Box 198, Madoc..... c/o W. E. Clark, Harcourt.....	Madoc Tp. Huntingdon Tp. Huntingdon Tp. Madoc Dist. Madoc Dist. Cardiff Tp. Huntingdon Tp. Huntingdon Tp. Cardiff Tp.

Garnet

ONTARIO— Niagara Garnet Co.....	c/o Wm. A. Yarwood, 8573 Krull Parkway, Niagara Falls, N.Y.....	River Valley
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Graphite

ONTARIO— Black Donald Graphite Ltd.....	Black Donald Mines.....	Brougham Tp.
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MISCELLANEOUS NON-METAL MINING INDUSTRIES IN CANADA—Continued

Grindstones

(*) Active but not producing.

Name of operator, province and product	Head office address	Plant location
NEW BRUNSWICK— Read, H. C.....	Bathurst.....	Stonehaven

Lithium Minerals

MANITOBA— Lithium Corp. of Canada Ltd. (*).....	403 Avenue Bldg., Winnipeg.....	Bernic and Cat Lakes
Sheritt Gordon Mines Ltd. (*).....	25 King St. W., Toronto, Ont.....	Herb Lake

Magnesitic Dolomite

QUEBEC— Canadian Refractories Ltd.....	1050 Canada Cement Bldg., Montreal.....	Kilmar and Harrington
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Mineral Waters

QUEBEC— Cie d'eau Minérale, La.....	632 Concord Ave., St. Hyacinthe.....	St. Hyacinthe
Eau Minérale Etoile.....	Ste. Généviève de Batiscan.....	Batiscan
Gurd, Charles & Co. Ltd.....	1016 Bleury St., Montreal.....	Varennes
Lemay, Lucien.....	St. François du Lac.....	Nicolet Tp.
Levesque, Ernest (*).....	Rivière-du-Loup Station.....	St. Louis de Kamouraska
Minard, Edward.....	Maskinongé.....	Maskinongé
Montclair-Richelieu Spring Water Co. Ltd.....	Chambly Basin.....	Chambly
Pellerin, A., and Sons.....	St. Barnabe N.....	St. Maurice
Sources Abenakis Springs Ltd.....	366 rue Racine, Granby.....	St. François du Lac
Source Coulombia.....	L'Epiphanie.....	L'Epiphanie
Source d'eau Minérale Radnor.....	St. Maurice.....	St. Maurice
Usine d'Embouteillage Maski.....	St. Justin.....	St. Justin
ONTARIO— Carlsbad Springs, The.....	Carlsbad Springs.....	Gloucester Tp.
Deneault, J. F.....	Bourget.....	Bourget
Gurd, Chas., & Co. Ltd. (*).....	1016 Bleury St., Montreal, Que.....	Caledonia Springs
Renaud, Victor.....	Blackburn.....	Blackburn

Phosphate

QUEBEC— Bigelow, Robert.....	Buckingham.....	Bowman Tp.
Blackburn Bros. Ltd.....	85 Sparks St., Ottawa.....	Perkins
High-Rock Phosphates Ltd.....	41 Main St., Buckingham.....	Portland W. Tp.
Victory Mines.....	517 Booth St., Ottawa, Ont.....	Hull W. Tp.
ONTARIO— Ontario Phosphate Industries Ltd. (*).....	Room 1101, 62 Richmond St. W., Toronto...	Bedford Tp.

Silica Brick

NOVA SCOTIA— Dominion Steel & Coal Corp. Ltd.....	Sydney.....	Sydney
ONTARIO— Algoma Steel Corp. Ltd.....	Sault Ste. Marie.....	Sault Ste. Marie

Sodium Carbonate

BRITISH COLUMBIA— Bishop, V. C. (Mrs.).....	c/o Boyds Garage, Clinton.....	Clinton area
Davison, E. C.....	2043 W. 42nd Ave., Vancouver.....	Clinton area

MISCELLANEOUS NON-METAL MINING INDUSTRIES IN CANADA—Concluded

Sodium Sulphate

(*) Active but not producing.

Name of operator, province and product	Head office address	Plant location
SASKATCHEWAN—		
Hart, Dr. D. C.	606 Broder Bldg., Regina.	Snake Hole Lake
Horseshoe Lake Mining Co. Ltd. (*).	Ormiston.	Ormiston
Mellor, John F.	Alsask.	Alsask
Midwest Chemicals Ltd.	Palo.	Whiteshore Lake
Natural Sodium Products Ltd.	Bishopric.	Frederic Lake Alsask
Sybouts Sodium Sulphate Co. Ltd.	Gladmar.	Gladmar

Sulphur (Pyrites)

QUEBEC—		
Aldermac Copper Corp. Ltd.	Dominion Square Bldg., Montreal.	Arntfield
Noranda Mines Ltd.	Royal Bank Bldg., Toronto.	Noranda
Waite-Amulet Mines Ltd.	Noranda.	Duprat Tp.
ONTARIO—		
International Nickel Company of Canada Ltd. (†).	Copper Cliff.	Copper Cliff
BRITISH COLUMBIA—		
Cons. Mining & Smelting Co. of Canada Ltd. (†).	Trail.	Trail
Britannia Mining & Smelting Co. Ltd.	Britannia Beach.	Britannia Beach

(†) Recover sulphur from smelter gas.

CLAY PRODUCTS AND OTHER STRUCTURAL MATERIALS

CANADIAN PORTLAND CEMENT PRODUCERS

Name of firm	Head office address	Location of plant
QUEBEC— Canada Cement Company Ltd.....	Box 290, Station B, Montreal.....	Hull, Montreal East
ONTARIO— Canada Cement Company Ltd..... St. Mary's Cement Company Ltd.....	Box 290, Station B, Montreal, Que..... 357 Bay St., Toronto.....	Belleville, Port Colborne St. Mary's
MANITOBA— Canada Cement Company Ltd.....	Box 290, Station B, Montreal, Que.....	Fort Whyte
ALBERTA— Canada Cement Company Ltd.....	Box 290, Station B, Montreal, Que.....	Exshaw
BRITISH COLUMBIA— British Columbia Cement Co. Ltd.....	500 Fort St., Victoria, B.C.....	Bamberton

LIST OF OPERATORS WHICH SHIPPED BRICK, TILE, SEWER PIPE, ETC., MADE FROM DOMESTIC CLAYS

(a) Clay used
(b) Shale used.(c) Idle.
(*) Produce Bentonite.

NOVA SCOTIA— Brooks, Stephen and Son (a) (b)..... Harriss and Harriss..... McCurdy, Henry (c)..... Shaw, L. E., Ltd. (a) (b)..... Standard Clay Products Ltd. (a) (b).....	Box 159, New Glasgow..... 5 Byng Ave., Sydney..... Middle Musquodoboit..... 74 Bedford Rd., Halifax..... St. Johns, Que.....	New Glasgow Sydney Middle Musquodoboit Lantz New Glasgow
NEW BRUNSWICK— Ryan, M. and Son, Ltd. (a)..... Shaw, L. E. Ltd. (b).....	Fredericton..... 74 Bedford Rd., Halifax, N.S.....	Fredericton. Chipman
QUEBEC— Ascot Tile and Brick Co. Ltd..... Canada China Clay & Silica Ltd..... Castonguay, Hubert..... Citadelle Brique Ltée (b)..... East-Angus Brick and Tile (a)..... LaPrairie Company Inc., The (a) (b)..... Montreal Terra Cotta Limited (a)..... Roy, O. and P. (a)..... St. Lawrence Brick Co. Ltd. (b)..... Scott Brique Reg., La (a)..... Standard Clay Products Ltd. (a)..... St. Jean La Brique Ltd. (a).....	Ascot Corner..... Kasil..... Deschailions..... 14 rue St. Joseph, Quebec..... Box 553, East Angus..... 906 University Tower Bldg., Montreal..... 911 Dominion Square Bldg., Montreal..... St. George West..... 1010 St. Catherine St. W., Montreal..... Scott Junction..... Box 189, St. Johns..... Deschailions.....	Ascot Corner Kasil Deschailions Boischatel Westbury Tp. LaPrairie, Delson Lakeside St. George West LaPrairie Scott Junction St. Johns Deschailions
ONTARIO— Barnes, Wm. R. Co. Ltd. (a)..... Broadwell, B. and Son (a)..... Canadian Pressed Brick Co. Ltd. (b)..... Central Tile Bricks Corp. Ltd. (a)..... Chapman Bros. (c)..... Construction Materials Ltd. (a) (b)..... Cooksville Company Ltd. (b)..... Cornhill, James & Sons Ltd..... Coults, George & Son (b)..... Curtin, F., Estate (a)..... Curtis Bros. (a)..... Deller, Albert & Son (a)..... Dochart Brick, Tile & Terra Cotta Works (a)..... Donaldson, Thos. G. (a)..... Douglas, John E. (a)..... Elliott, James, Jr. (a)..... Elliott, Wm. (a)..... Fletcher Brick & Tile (a)..... Frid Bros. Ltd. (a)..... Gammage, C. R..... Hamilton Pressed Brick Co. Ltd. (a) (b)..... Hill, A. W. & Sons..... Howlett, Fred W. & Sons Ltd. (a)..... Huntsville Brick Works (a)..... Interprovincial Brick Co. Ltd. (b)..... Jamieson Lime Co..... Jones, D. A. (a)..... Jasperson Brick & Tile Co. (c)..... Koebel Bros. (a).....	243 Cumberland Ave., Hamilton..... Kingsville..... Kenilworth S., Hamilton..... Tilbury..... 145 Dawes Rd., Toronto..... Drawer 70, New Toronto..... 46 Bloor St. W., Toronto..... Box 36, Chatham..... Thedford..... R.R. 4, Lindsay..... Box 809, Peterborough..... Brownsville..... Arnprior..... R.R. 1, Greenock..... Wilkesport..... 519 Wellington St. W., Sault Ste. Marie..... R.R. 1, Glenannan..... Fletcher..... 790 Main St. W., Hamilton..... R.R. 2, Dresden..... 211 Kensington Ave. S., Hamilton..... Coatsworth..... Petrolia..... Box 308, Huntsville..... 46 Bloor St. W., Toronto..... Renfrew..... Mt. Brydges..... Kingsville..... St. Clements.....	Waterdown Gosford S. Tp. Hamilton Tilbury East York Tp. Etobicoke Tp. Cooksville Harwich Tp. Bosanquet Tp. Lindsay Otonabee Tp. Brownsville Arnprior Culross Tp. Lambton Co. Korah Tp. Bruce Co. Tilbury E. Tp. Hamilton Camden Tp. Wentworth Co. Tilbury E. Tp. Lambton Co. Chaffey Tp. Cheltenham, Milton Renfrew Caradoc Tp. Coatsworth Tp. St. Clements

LIST OF OPERATORS WHICH SHIPPED BRICK, TILE, SEWER PIPE, ETC., MADE FROM DOMESTIC CLAYS—Concluded

(a) Clay used.
(b) Shale used.(c) Idle.
(*) Produce Bentonite.

Name of firm	Head office address	Location of plant
ONTARIO—Concluded		
Lindsay, Earl & Sons (a).....	R.R. 2, Wallaceburg.....	Kent Co.
Martin, Amos C. (a).....	R.R. 3, Wallenstein.....	Peel Tp.
McFarlane, W. J. (b).....	Forest.....	Forest
McFarren, P. B., Ltd. (b).....	120 Wellington St. W., Toronto.....	Streetsville
Milton Brick Co. Ltd. (b).....	170 Bloor St. W., Toronto.....	Esqueving Tp.
Napanee Brick & Tile Works (a).....	R.R. 3, Napanee.....	Lennox Co.
National Fireproofing Co. of Canada Ltd. (a) (b).....	57 Bloor St. W., Toronto 5.....	Wentworth
National Sewer Pipe Co. Ltd. (a) (b).....	Aldershot.....	E. Glamboro Tp. Hamilton Swansea Temiskaming Oxford Co. Etobicoke Tp. Billings Bridge Owen Sound St. Catharines London East York Kitchener Beaverton Tuckersmith Tp. Toronto Paipowge Tp. Grey Tp. Toronto, York Tp. Widdfield Tp. Tilbury W. Tp.
Northern Brick & Clay Products (a) (c).....	New Liskeard.....	
Norwich Brick & Tile Works (a).....	R.R. 2, Norwich.....	
Ontario Reformatories (a) (b).....	Mimico.....	
Ottawa Brick & Terra Cotta Co. Ltd. (a) (b).....	Billings Bridge.....	
Owen Sound Brick Co. Ltd. (a).....	Owen Sound.....	
Paxton, Fred R. (a).....	70 Herrick Ave., St. Catharines.....	
Phinn Brick Co. (a).....	1042 Adelaide St., London.....	
Phippen & Son (a).....	390 Dawes Rd., East York.....	
Seegmiller, E. & E., Ltd. (a).....	525 Wendell Ave., Kitchener.....	
Snelgrove, A., Estate (a).....	Beaverton.....	
Sproat and Sproat (a).....	R.R. 4, Seaforth.....	
Standard Brick Co. (a).....	500 Greenwood Ave., Toronto.....	
Superior Brick & Tile Co., Ltd. (a).....	426 Victoria Ave., Fort William.....	
Thomson, Ralph (a).....	R.R. 4, Atwood.....	
Toronto Brick Co. Ltd. (a) (b).....	897 Bay St., Toronto 5.....	
Wallace, R., & Son (a).....	92 First Ave., North Bay.....	
Wright, F. M. (a).....	Comber.....	
MANITOBA—		
Alsip Brick, Tile & Lumber Co. Ltd. (a).....	537 Portage Ave., Winnipeg.....	Winnipeg
Pembina Mt. Clays Ltd. (*).....	915 Paris Bldg., Winnipeg.....	Morden
Wardrop, D. M. (a).....	Whitemouth.....	Whitemouth
SASKATCHEWAN—		
Alberta Clay Products Co. Ltd. (a).....	Medicine Hat, Alta.....	Ravenscrag Eastend Willows Bruno
Bruno Clay Works Ltd. (a).....	411 Alberta Ave., Saskatoon.....	
Dominion Fire Brick & Clay Products Ltd. (a).....	Box 99, Moose Jaw.....	Claybank
International Clay Products Ltd. (a).....	Box 399, Estevan.....	Estevan
Medalta Potteries Ltd. (a).....	332, 7th Ave. W., Calgary, Alta.....	Willows, Eastend
Medicine Hat Potteries (a).....	Box 672, Medicine Hat, Alta.....	Redlyn
Midland Clay Co. (a) (c).....	Willow Bunch.....	Willow Bunch
ALBERTA—		
Acme Brick Co. Ltd. (a).....	125 Alberta Block, Edmonton.....	Cannell
Aetna Coal Co. (*).....	East Coulee.....	Rosedale Ferry
Alberta Clay Products Co. Ltd. (a).....	Medicine Hat.....	Medicine Hat
Grande Prairie Brick Yard.....	Grande Prairie.....	Grande Prairie
Gunderson Brick & Coal Co. Ltd. (b).....	Redcliffe.....	Redcliffe
Kidd, Gordon L. (*).....	Box 230, Drumheller.....	Sec. 14-29-20 W. 4
Medicine Hat Brick & Tile Co. Ltd. (a).....	Box 100, Medicine Hat.....	Medicine Hat
Redcliffe Pressed Brick Co. Ltd. (a) (b).....	Redcliffe.....	Redcliffe
BRITISH COLUMBIA—		
Baker Brick & Tile Co. Ltd. (a).....	3191 Douglas St., Victoria.....	Victoria
Bazan Bay Brick & Tile Co.	Saanichton.....	Bazan Bay
Clayburn Co. Ltd. (a) (b).....	850 W. Hastings St., Vancouver.....	Kilgard
Evans, Coleman & Evans (b).....	902 Columbia St., Vancouver.....	Gabriola Island
Fairay & Co. (a).....	661 Taylor St., Vancouver.....	Vancouver
Gypsum, Lime & Alabastine Canada, Ltd. (*)	Paris, Ont.....	New Westminster
Glover, F. (*).....	Princeton.....	Princeton
Haug, Wm. & Son (a).....	Box 220, Kelowna.....	Kelowna
Port Haney Brick Co. Ltd. (a).....	846 Howe St., Vancouver.....	Haney
Port Moody Brick Co. (a).....	1875 E. 38th Ave., Vancouver.....	Port Moody
Richmond, Geo. W. (a).....	4190 Blenheim St., Vancouver.....	Kilgard
Vancouver Brick & Tile Co. Ltd. (a).....	902 Columbia St., Vancouver.....	Sullivan

PRODUCERS OF STONEWARE AND POTTERY

Name of firm	Head office address	Location of plant
NEW BRUNSWICK—		
Canuck Pottery.....	198 Union St., Saint John.....	Saint John
Deichmann, K.....	Moss Glen.....	Moss Glen
Foley Pottery Ltd.....	Saint John.....	Musquodoboit Saint John
QUEBEC—		
Poterie du Saguenay, La.....	Chicoutimi.....	Chicoutimi
Laurentian Art Pottery Inc.....	St. Jerome.....	St. Jerome
ONTARIO—		
Foster Pottery Co.....	Main St. W., Hamilton.....	Hamilton
ALBERTA—		
Medalta Potteries Ltd.....	332, 7th Ave. W., Calgary.....	Medicine Hat
Medicine Hat Potteries.....	Medicine Hat.....	Medicine Hat

LIST OF FIRMS IN THE IMPORTED CLAY PRODUCTS INDUSTRY

Name of firm	Address
QUEBEC—	
Canada Firebrick Company Limited.....	4741 St. Ambroise St., Montreal
Canadian Potteries Limited.....	5 Mackenzie King St., St. Johns
Standard Clay Products.....	St. Johns
Walker-Hind-Sutherland Refractories Ltd.....	309 St. Ferdinand St., Montreal
ONTARIO—	
Ajax Clay Products.....	4160 Dundas St. W., Toronto
Armco Limited.....	Bower St., Acton
Canadian Ohio Brass Company Limited.....	Thorold Rd., Niagara Falls
Canadian Porcelain Company Limited.....	Paradise Rd., Hamilton
Canada Vitriified Products Limited.....	Talbot St. E., St. Thomas
Dominion Potteries.....	Dundas St. N., Oakville
Donvale Pottery Company.....	27 Davies Ave., Toronto 8
Ecanada Art Pottery.....	206 Dundurn St. S., Hamilton
Frontenac Floor & Wall Tile Co. Limited.....	Kingston
Georgetown Clay Products Limited.....	King St., Georgetown
Green, A. P., Fire Brick Co. Ltd.....	Commercial St. (Leaside), Toronto 12
Hamilton Potteries Limited.....	100 Locke St., Hamilton
McMaster Pottery.....	Main St., Dundas
National Refractories Limited.....	Port Robinson
Plibrico Jointless Firebrick Ltd.....	Hornor Ave., Toronto 14
Robinson Clay Product Co. of Canada Ltd.....	119 Shaftesbury Ave., Toronto
Smith Potteries.....	353 King St. W., Oshawa
Sovereign Potteries Limited.....	282 Sherman Ave. N., Hamilton
Turner's Plastic Fire Brick Co. Ltd.....	Audley St., Mimico
BRITISH COLUMBIA—	
Allen Refractories.....	69E, 1st Ave., Vancouver

THE CANADIAN LIME INDUSTRY

(*) Inactive.

(a) Use calcium or high calcium limestone.

(b) Use dolomitic limestone.

(c) Purchase lime.

(d) Kind of limestone not reported.

(e) Brucitic limestone.

Name of firm	Head office address	Location of plant
NOVA SCOTIA—		
Dominion Steel & Coal Corp. Ltd. (b).....	Sydney.....	Sydney
Eastern Lime Co. Ltd. (a) (*).....	Windsor.....	Windsor
NEW BRUNSWICK—		
Bathurst Power & Paper Co. Ltd. (a).....	Bathurst.....	Bathurst
Purdy and Green Ltd. (a).....	204 Metcalfe St., Saint John.....	Saint John
Snowflake Lime Ltd. (a) (b).....	Saint John.....	Saint John
QUEBEC—		
Aluminum Company of Canada Ltd. (e).....	1700 Sun Life Bldg., Montreal.....	Wakefield
Arnaud, Edwilda (d).....	Joliette.....	Joliette

THE CANADIAN LIME INDUSTRY—Concluded

Name of firm	Head office address	Location of plant
QUEBEC—Concluded		
Bousquet, Adrien (d).....	St. Dominique.....	St. Dominique
Canadian Refractories Ltd. (e).....	1050 Canada Cement Bldg., Montreal.....	(e)
Carriere St. Maurice Ltd. (d).....	1293 rue Hart, Trois-Rivieres.....	St. Louis de France
Carriere Trois-Rivieres Ltd. (a).....	St. Louis de France.....	St. Louis de France
Cote, Joseph (a).....	Metabetchouan.....	Metabetchouan
Deschambault Quarry Corp. (d) (*).....	St. Marc des Carrieres.....	St. Marc des Carrieres
Dominion Lime Ltd. (a).....	Lime Ridge.....	Lime Ridge
Filion, Narcisse (d) (*).....	St. Joachim.....	St. Joachim
Lalumiere, Joseph (d) (*).....	St. Dominique.....	St. Dominique
Laurentian Stone Co. Ltd. (a).....	195 Nicholas St., Ottawa, Ont.....	Hull
Limoges, Henri (a).....	552 Poupart St., Montreal.....	St. Michel
Mercure, Camille (a).....	555, 16th Ave., St. Hyacinthe.....	St. Dominique
Shawinigan Chemicals Ltd. (a).....	Craig St. W., Montreal.....	Shawinigan Falls
Standard Lime Co. Ltd. (a).....	St. Paul de Joliette.....	St. Paul de Joliette
Trottier, David (d).....	St. Marc des Carrieres.....	St. Marc des Carrieres
ONTARIO—		
Bell, Cecil (d).....	R.R. 4, Chesley.....	Sullivan Tp.
Brunner, Mond Canada, Ltd. (a).....	Canadian Bank of Commerce Bldg., Toronto.....	Anderton Tp.
Canada & Dominion Sugar Co. Ltd. (a).....	Chatham.....	Wallaceburg
Canadian Gypsum Co. Ltd. (b).....	170 Bloor St. W., Toronto.....	Guelph
Carleton Lime Products Co. (a).....	Box 26, Carleton Place.....	Carleton Place
Chalmers Lime Products Ltd. (b).....	689, 7th St. W., Owen Sound.....	Owen Sound
Chemical Lime Co. Ltd. (a).....	Beachville.....	Oxford Co.
Gypsum, Lime & Alabastine, Canada, Ltd. (a) (b).....	Paris.....	Beachville, Glen Christie, Halton
Jamieson Lime Co. (a).....	Renfrew.....	Horton Tp.
North American Cyanamid Ltd. (a).....	Niagara Falls.....	Niagara Falls
Rockwood Lime Co. (b).....	Box 46, Rockwood.....	Rockwood
Shane Lime & Charcoal Co. Ltd. (a).....	Eganville.....	Grattan Tp.
MANITOBA—		
Building Products & Coal Co. Ltd. (b).....	111 Christie St., Winnipeg.....	Inwood
Gypsum, Lime & Alabastine, Canada, Ltd. (b).....	Paris, Ont.....	(c)
Manitoba Sugar Co. Ltd. (a).....	Fort Garry.....	Fort Garry
Winnipeg Supply & Fuel Co. Ltd. (a) (b).....	812 Boyd Bldg., Winnipeg.....	Moosehorn, Stonewall
ALBERTA—		
Canadian Sugar Factories Ltd. (a).....	Raymond.....	Raymond, Picture Butte
Errico, M. (d).....	Cadomin.....	Cadomin
Loder's Lime Co. Ltd. (a).....	Kananaskis.....	Kananaskis
Summit Lime Works Ltd. (a).....	Box 273, Lethbridge.....	Crow's Nest Dist.
BRITISH COLUMBIA—		
Pacific Lime Co. Ltd. (a).....	744 W. Hastings St., Vancouver.....	Texada Island
Pacific Mills Ltd. (a).....	Campbell Ave., Vancouver.....	Ocean Falls

PRINCIPAL SAND AND GRAVEL OPERATORS, 1944

In addition to the names listed below, production has been reported by the railway companies for ballast, and also a considerable amount by counties and townships in Ontario for road use.

(w) Markets washed or screened material.

Name of firm	Head office address	Location
NOVA SCOTIA—		
Crocket, V. B.....	Wallace.....	Colchester Co.
Nova Scotia Department of Highways.....	Halifax.....	Various
Warren Bituminous Paving Co. Ltd. (w).....	1454 Bloor St. W., Toronto, Ont.....	Yarmouth
NEW BRUNSWICK—		
Likely, Jos A. Ltd. (w).....	Saint John.....	East Saint John
New Brunswick Department of Highways.....	Fredericton.....	Various
Warren Bituminous Paving Co. Ltd. (w).....	1454 Bloor St. W., Toronto, Ont.....	Sussex
QUEBEC—		
Beaudry, Antoine.....	1706 Plessis, Montreal.....	St. Henri
Bigras, Omer.....	Ste. Rose Ouest.....	Ste. Rose Ouest
Bonner Sand & Ballast Ltd. (w).....	1434 St. Catherine St. W., Montreal.....	South Durham
Breen, Thos.....	Kearns.....	Guigues
Brouillet Sand & Gravel Co.....	Rawdon.....	St. Julienne
Canadian Johns Manville Co. Ltd.....	Sun Life Bldg., Montreal.....	Asbestos
Coaticook, City of.....	Coaticook.....	Coaticook

PRINCIPAL SAND AND GRAVEL OPERATORS—Continued

Name of firm	Head office address	Location
QUEBEC—Concluded		
Compagnie de Sable Ltee (w)	10, 3eme Ave., Quebec	St. Charles River
Consolidated Oka Sand & Gravel Co. Ltd. (w)	248 McCord St., Montreal	Lake of Two Mountains
Gagnon, Arthur	Grand mere	Garneau Jct.
Goyer, Edouard & Frere	Saint Bruno	St. Bruno
Granby, City of	Granby	Granby
Laberge, Evariste	Ste. Foy	Ste. Foy
La Corporation de la Ville de Magog	Magog	Magog
Latulippe, Philippe (w)	240 rue de la Ronde, Quebec	St. Charles River
Marchand, Euclide	505-8e rue Alma-ville-en-haut	Mont Carmel
Mercure, Camille	555-16eme Ave., St. Hyacinthe	St. Dominique
Potier & Freres	8645 rue Casgrain, Montreal	Two Mountains
Quebec, City of	Quebec	Ste. Therese de Beauport
Romouski, City of	Rimouski	Rimouski
Riverin, Jean-Joseph Ltee	115 Jacques Cartier, Chicoutimi	Various
Robert & Dufour Enrg.	Ste. Anne de Beauport	Beauport West
St. Francis River Dredging Co. (w)	St. Francois du Lac	St. Francis River
Sherbrooke, City of	Sherbrooke	Orford Tp.
Standard Lime Co. Ltd. (w)	Joliette	Ste. Emelie
Standard Sand & Gravel Ltd. (w)	St. Felix de Valois	St. Felix de Valois
Tremblay, Jos. Ltee	376 rue Georges, Shawinigan Falls	St. Mathieu
Venne, Oscar	Lachenaie	Lachenaie
ONTARIO—		
Allan, James	R.R. 3, Seaforth	Seaforth
Axford, J. B.	35 Elm St., St. Thomas	South Yarmouth
Barnes, Wm. R. Co. Ltd. (w)	243 Cumberland Ave., Hamilton	Waterdown
Beckett, Morden (w)	Winona	Winona
Benson & Patterson	Stamford	Stamford
Boyd Bros.	Osgoode	Osgoode
Braas Bros. (Hillcrest Sand Co.)	Niagara Falls	Stamford
Brantford, City of	Brantford	Brantford
Burrows, J.	North Bay	Widdfield Tp.
Cameron & Phin (w)	Welland	Port Maitland
Coleman, Gordon T.	235 Sidney St., Cornwall	Bonville
Conlin, Herbert L. Estate (w)	66 King St. W., Toronto	Scarboro Tp.
Consolidated Sand & Gravel Ltd.	402 Harbour Commission Bldg., Toronto	Fuller, Paris and Waterford
Cooper, A. & Co.	212 N. May St., Fort William	Thunder Bay
Cudmore, Harold T.	Hensall	Hensall
Curran & Briggs Ltd. (w)	61 Haverson Blvd., Toronto	Wilberforce, Brooke and Bancroft
Dibblee Construction Co. Ltd. (w)	248 Albert St., Ottawa	Bowesville Road
Ellis Bros.	304 Scarlett Rd., Toronto 9	Etobicoke Tp.
Fewster, Stanley	R.R. 4, St. Marys	Oxford Co.
Forwell Sand & Gravel Ltd.	31 Whitney Place, Kitchener	Waterloo
Foster, R. R.	86 Spadina Ave., Ottawa	Briantania Heights
Gauthier, J.	Porcupine	Whitney Tp.
Goodreau, Charles Estate (w)	Northwood	Harwich Tp.
Grandmaitre, Donat	71 Montreal Rd., Eastview	Rockliffe Village
Hall, Thomas G.	Plattsville	Blenheim Tp.
Hollinger Cons. Gold Mines Ltd.	Timmins	Tisdale Tp.
Howard Sand & Gravel Co. Ltd. (w)	Aldershot	Flamboro Tp.
Jupp, A. E. Construction Co. Ltd.	56 Blake St., Toronto	Pickering Tp.
Kingston Sand & Gravel Ltd.	235 Wellington St., Kingston	Kingston Tp.
McAuley, P. L.	Trenton	Trenton
McLean, A. B. & Sons (w)	Sault Ste. Marie	Sault Ste. Marie
National Sand & Material Co. Ltd. (w)	402 Harbour Bldg., Toronto	River
Nicholson Transit Co. Ltd. (w)	9690 W. Jefferson Ave., Detroit, Mich.	
Quigley's Foundry Sands (w)	U.S.A.	Eastern Cap
Rayner Construction Ltd. (w)	Bartonville	Waterdown
Scott, Thos.	29 Commercial St., Leaside	Fergus & Geraldton
Smythe, C. Ltd. (w)	R.R. 1, Seaforth	McKillop Tp.
Spratt, G. H. (w)	Box 8, Postal Station D, Toronto 9	Mt. Dennis
Tees Transit Co. (w)	Billings Bridge	Billings Bridge
Towland Construction Co. Ltd. (w)	58 Whitton Rd., Hamilton	Niagara Bar
United Towing & Salvage Co. Ltd. (w)	294 Dundas St., London	Bentinck Tp.
White, Bertha M. (w)	635 Common St., Montreal, P.Q.	Lake Superior
Woollatt Fuel & Supply Co. Ltd. (w)	209 N. Vidal St., Sarnia	Sarnia Tp.
	2171 Ottawa St., Walkerville	Leamington
MANITOBA—		
Alsip Brick, Tile & Lumber Co. Ltd.	537 Portage Ave., Winnipeg	Beausejour
Brandon, City of	City Hall, Brandon	Brandon
Building Products & Coal Co. Ltd. (w)	111 Christie St., Winnipeg	Bird's Hill
Greater Winnipeg Water District	185 King St., Winnipeg	Mile 31 and Mile 80 G.W.W.D. Ry.
Manitoba Department of Highways	Winnipeg	Various
McCurdy Supply Co. Ltd. (w)	1034 Arlington St., Winnipeg	
Winnipeg, City of	223 James Ave., Winnipeg	Bird's Hill
SASKATCHEWAN—		
Betteridge, Stanley	Pilot Butte	Pilot Butte
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Bldg., Winnipeg, Man.	Flin Flon
Prince Albert, City of	Prince Albert	Prince Albert
Saskatchewan Department of Highways	Regina	Various

PRINCIPAL SAND AND GRAVEL OPERATORS—Concluded

Name of firm	Head office address	Location
ALBERTA—		
Alberta Department of Highways.....	Edmonton.....	Various
Cristall Sand.....	10165, 104th St., Edmonton.....	Perryvale
Jefferies & Sons Ltd. (w).....	Calgary.....	Calgary
BRITISH COLUMBIA—		
British Columbia Department of Highways..	Victoria.....	Various
Chilliwack, City of.....	Chilliwack.....	Chilliwack Tp.
Consolidated Mining & Smelting Co. of Canada Ltd.....	Trail.....	Fort Steel and Tadanac
Deeks Sand & Gravel Co. Ltd. (w).....	101 West 1st Ave., Vancouver.....	Coquitlam, North Vancouver and Seymour Creek
Gilley Bros. Ltd. (w).....	902 Columbia St., New Westminster.....	Port Coquitlam
Gravel Contractors Ltd.....	Dawson Creek.....	Pouce Coupé River
Highland Sand & Gravel Co. Ltd. (w).....	Lynn timer.....	Lynn timer
Hillside Sand & Gravel Co. Ltd. (w).....	1075 Main St., Vancouver.....	Hillside
McIntyre & Harding Gravel Co. Ltd. (w)....	Royal Oak P.O., Saanich.....	Nelson
Nelson, City of (w).....	501 Front St., Nelson.....	Nelson
Pikethly Bros. (w).....	8899 Angus Drive, Vancouver.....	Vancouver
Port Alberni, City of.....	Port Alberni.....	Alberni District
Producers Sand & Gravel Co. (1929) Ltd. (w)	1902 Store St., Victoria.....	Royal Bay
Road Materials Ltd. (w).....	8899 Hudson St., Vancouver.....	North Vancouver
Saanich, District of.....	Royal Oak P.O., Vancouver Island.....	Saanich Municipality

DIRECTORY OF THE STONE QUARRYING INDUSTRY, 1944

(*) Firms operating dressing works in conjunction with quarry.

(†) Did not ship in 1944.

Granite

Name	Head office address	Location
NOVA SCOTIA—		
Bower, A. R.	Box 255, Shelburne.....	Shelburne
Dauphinee, W. T. (*).....	Shelburne.....	Shelburne
N. S. Department of Highways.....	Halifax.....	Various
Nixon, W. H. (*).....	R.R. 3, Middleton.....	Nictaux South
Rice Bros. (*).....	Lawrencetown.....	Nictaux West
Rice, W. D. (†).....	Middleton.....	Nictaux West
NEW BRUNSWICK—		
Granite Street Pavement & Construction Co. Ltd. (*).....	Box 1137, Saint John.....	Hampstead
Milne Coutts & Co. Ltd. (*).....	St. George.....	St. George
Mooney, B., and Sons, Realty Ltd.....	49 Canterbury St., Saint John.....	Hampstead
O'Brien and Baldwin (*).....	St. George.....	St. George
Spinneys Quarry.....	Box 96, St. George.....	St. George
QUEBEC—		
Anderson, James (*).....	Box 125, Beebe.....	Beebe
Bérubé, Lucien (*).....	Brownsburg.....	Chatham Tp.
Bolduc, Antonio (*).....	St. Sebastien.....	Beauce
Brodie's Limited (*).....	1070 Bleury St., Montreal.....	Mount Johnson
Bussièrès, Gérard (*).....	St. Sebastien.....	Graniteville
Cloutier, R. L. (*).....	Beebe.....	Guenette
Delwaide & Goffin (*).....	1365 rue St. Valier, Quebec.....	St. Cecile
Deschambault Quarry Corp.....	56 rue St. Pierre, Quebec.....	Beebe
Desy, Lorenzo.....	Almaville.....	Chicoutimi
Didier, Joseph Belley.....	330 St. Dominique, Jonquière.....	St. Gérard
Dubois, Honoré (*).....	Rivière à Pierre.....	Almaville
Drummond, La Compagnie Pierre Concasse..	Box 735, Sherbrooke.....	Jonquière
Dumas & Voyer (*).....	Rivière à Pierre.....	Rivière à Pierre
Gaboriault & Nevers (*).....	Box 65, Grenville.....	Drummondville
Gagnon, Arthur.....	1740 4ème rue, Grand'Mère.....	Rivière à Pierre
Gosselin, Oscar.....	St. Samuel.....	Grenville Tp.
Granite National Ltée (*).....	St. Joseph d'Alma.....	Grand'Mère
Grenier, Elie.....	Glenada.....	St. Samuel
Lacasse & Boulais.....	Box 23, Beebe.....	St. Gédéon
Laforce, H., & Fils (*).....	1327 rue St. Valier, Quebec.....	St. Joseph d'Alma
Laroche, Omer.....	Rivière à Pierre.....	St. Joseph d'Alma
Maltais, Charles.....	Box 160, St. Joseph d'Alma.....	Glenada
Quebec North Shore Paper Co.....	680 Sherbrooke St. W., Montreal.....	Beebe
St. Bruno Quarry & Paving Co. Ltd.....	638 Ave. Querbes, Outremont.....	Chicoutimi
Scotstown Granite Co. Ltd. (*).....	660 St. Catherine St. W., Montreal.....	Rivière à Pierre
		St. Joseph d'Alma
		Baie Comeau
		Chambly Co.
		Cap St. Martin

DIRECTORY OF THE STONE QUARRYING INDUSTRY, 1944—Continued

Granite—Concluded

Name	Head office address	Location
QUEBEC—Concluded		
Sherbrooke, Cité de.....	Box 754, Sherbrooke.....	Sherbrooke
Shawinigan Carrière Reg.....	57A First St., Shawinigan Falls.....	Ste. Flore
Silver Granite Co. Ltd. (*).....	2331 rue Provençal, Montreal.....	St. Samuel
Stanstead Granite Quarries Co. Ltd. (*).....	Beebe.....	Beebe
Wilkinson, Frank L. (†).....	Beebe.....	Stanstead Co.
ONTARIO—		
Building Products Ltd. (*).....	Box 6063, Montreal.....	Madoc
Curran & Briggs Ltd.....	61 Haverson Blvd., Toronto.....	Kohler Tp.
Fort William, City of.....	Fort William.....	Fort William
Hewitson Construction Co. Ltd.....	509 Public Utilities Bldg., Port Arthur.....	McIntyre Tp.
Ontario Rock Co. Ltd.....	Room 303, 2 College St., Toronto.....	Peterborough Co.
MANITOBA—		
Winnitoba Marble Co. Ltd. (*).....	1180 Wall St., Winnipeg.....	W. Hawk Lake
BRITISH COLUMBIA—		
B.C. Monumental Works Ltd. (*).....	27 Kingsway, Vancouver.....	Vancouver Dist.
Coast Quarries Limited.....	1840 West Georgia St., Vancouver.....	Granite Falls
Gilley Bros. Ltd.....	902 Columbia St., New Westminster.....	Cooquitlam
Nelson, City of.....	Nelson.....	Nelson M.D.
Nelson Granite & Monumental Co. (*).....	Nelson.....	Nelson M.D.
Trail, Corp. of.....	Trail.....	Trail
Vancouver Granite Co. Ltd.....	308 Pacific Bldg., Vancouver.....	Nelson Island
Vernon Granite & Marble Co. (*).....	Box 265, Vernon.....	Vernon M.D.
Wilson, James (*).....	Sirdar.....	Nelson M.D.

Limestone

NOVA SCOTIA—		
Dillman Bros. (*).....	Admiral Rock.....	Admiral Rock
Eastern Lime Co. Ltd. (*).....	Windsor.....	Windsor
Kirkpatrick, Robie.....	Kirkhill.....	Kirkhill
Mosher Limestone Co. Ltd.....	Upper Musquodoboit.....	Upper Musquodoboit
Nairn, J. S.....	24 Whitney Ave., Sydney.....	Scotch Lake
Nova Scotia Department of Agriculture.....	Halifax.....	Various
NEW BRUNSWICK—		
Brookville Manufacturing Co. Ltd.....	Brookville.....	Brookville
Snowflake Lime Ltd.....	3 Pokiok Rd., Saint John.....	Saint John
QUEBEC—		
Aluminum Co. of Canada Ltd.....	1700 Sun Life Bldg., Montreal.....	Chicoutimi
Amendements Calcaire de R-B, Les.....	Rivière-Bleue.....	Rivière-Bleue
Andorno, Jean (*).....	Cap St. Martin.....	Cap St. Martin
Beaudry, J. P.....	101 Taché, Joliette.....	Joliette
Bedard, Jean, Ltée (*).....	82, 33rd Ave., Lachine.....	Caughnawaga
Boucher, Louis.....	Percé.....	Gaspé Co.
Boucher, Telesphore.....	Notre Dame de la Salette.....	Notre Dame de la Salette
Bourget, John D.....	Defonceville.....	Gaspé Co.
Canada Cement Co. Ltd.....	Box 290, Station B, Montreal.....	Hull
Canadian Quarries Company.....	4740 rue Iberville, Montreal.....	Laval Co.
Carrière du Cap St. Martin.....	636 Ave. Querbes, Outremont.....	Cap St. Martin
Carrière Gravel Ltée.....	Chateau Richer.....	Chateau Richer
Carrières de St. Dominique Ltée.....	555, 16ème Ave., St. Hyacinthe.....	St. Dominique
Carrière Pointe-Claire.....	Dorion, Vaudreuil.....	Beaconsfield
Carrière St. Barthelemi Ltée.....	St. Barthelemi.....	St. Barthelemi
Carrière St. Maurice Ltée.....	1293 rue Hart, Trois Rivières.....	St. Louis de Fracne
Carrière Trois Rivières Ltée.....	St. Louis de France.....	St. Louis de France
Carrière Lagacé Ltée.....	130 Blvd. Labelle, L'Abord-à-Plouffe.....	L'Abord-à-Plouffe
Charbonneau & Cie.....	St. Francois de Sales.....	Laval Co.
Departement de la Justice (*).....	Ottawa.....	St. Vincent de Paul
Deschambault Quarry Corp. (*).....	56 rue St. Pierre, Quebec.....	St. Marc des Carrières
Dominion Lime Ltd.....	Lime Ridge.....	Lime Ridge
Drouin, Belonnie.....	St. George W., Beauce.....	Ste. Justine
Durocher, Cyrville.....	11021 Notre Dame E., Montreal.....	Montreal East
Filion, Aldège.....	Lachute.....	Lachute
Fiset, Eliodore.....	St. Marc des Carrières.....	Portneuf Co.
Fortin, Camille.....	Chambord Junction.....	Lac St. Jean
Gagné, Octave.....	St. Ulric.....	St. Ulric
Gagnon & Leclerc.....	St. Joachim.....	St. Joachim
Gaspesian Fertilizer Co.....	Port Daniel E.....	Port Daniel E.
Gauthier, Jos. O. (*).....	St. Marc des Carrières.....	St. Marc des Carrières
Gingras & Frère Ltée.....	St. Marc des Carrières.....	St. Marc des Carrières
Gosselin, A.....	St. Laurent.....	St. Laurent
Gouin, J. A.....	Box 240, Trois Rivières.....	St. Marc des Carrières
Kennedy Construction Co. Ltd.....	407 McGill St., Montreal.....	Actonvale
Lakeshore Construction Co. Ltd.....	137 Cartier Ave., Pointe Claire.....	Pointe Claire
Landry, J. P. A.....	St. André, Matapedia.....	St. André

DIRECTORY OF THE STONE QUARRYING INDUSTRY, 1944—Continued

Limestone—Continued

Name	Head office address	Location
QUEBEC—Concluded		
Languais, Adjutor	St. Marc des Carrières	St. Marc des Carrières
Larouche, Jean B.	Baie St. Paul	Baie St. Paul
Lasalle Quarry Ltd.	8413 Blvd. St. Michel, Ville St. Michel	Ville St. Michel
Laurentian Stone Co. Ltd.	195 Nicholas St., Ottawa	Hull
Leclerc, J. J.	Drapeau	Drapeau
Martineau Fils Ltée (*)	517E Marie-Anne, Montreal	Rosemount
Mercure, Camille	555, 16eme Ave., St. Hyacinthe	St. Dominique
Miner, R. H., Co. Ltd.	719 Sun Life Bldg., Montreal 2	Belanger Village
Ministère de la Voirie	Quebec	St. Laurent
Montreal Quarry & Cut Stone Co.	2020 Ave. Union, Montreal	St. Charles de Bellechasse
National Quarries Ltd.	6301 Park Ave., Montreal	Montreal
Naud, Eugene	Hamlin	Laval Co.
Ouimet, Eugene	R. R. 2, St. Jean	St. Marc des Carrières
Paquette, Lewis	Cap St. Martin	St. Jean
Paquin, Laurent (*)	1043 Blvd. des Forges, Trois Rivières	Cap St. Martin
Pelletier, Jos. E.	Ste. Anne des Monts	Trois Rivières
Raby, Emile (Syndicate Co-operative)	Ferme-Neuve	Gaspé N.
Rioux, Louis	Cowansville	Ferme-Neuve
Roberval, Cie de Construction Ltée	Roberval	Cowansville
Rousseau, T. E.	105 Cote de la Montagne, Quebec	Roberval
Salaberry de Valleyfield, La Cité	Hotel de Ville, Salaberry de Valleyfield	Matapedia Co.
St. Francis Rock Products & Equipment Ltd.	42 Vivian Ave., Mount Royal	Salaberry de Valleyfield
St. Laurent Stone Products & Supplies Ltd.	42 Vivian Ave., Mount Royal	St. Laurent
Shawinigan Chemicals Ltd.	Power Bldg., Montreal	St. Laurent
Syndicat de St. Godfroi	c/o S. Grenier, St. Godfroi	Bedford
Standard Clay Products Ltd.	Box 189, St. Johns	St. Godfroi
Standard Lime Co. Ltd.	Joliette	St. Johns
Syndicat de Broyage de Lévis	R. R. 1, St. Joseph de Lévis	St. Paul de Joliette
Tanguay, J. L. and Royer, A.	Ste. Justine	St. Joseph de Lévis
Trappe de N. D. de Mistassini, La	Village de Pères (Roberval)	Ste. Justine
Tremblay, Nap.	31 rue Joffre, Hull	Mistassini
Tremblay, Welley	Ste. Anne, Chicoutimi	Hull
Union des Carrières & Pavages Ltée	48, 21ème Ave., Limoilou, Quebec	Tremblay Cantor
Varin, Joseph	Chemin Cote St. Michel, Montreal	Quebec
Verreault, Elz. Ltée	194 Dupont, Quebec	Montreal
Viau, Paul	340 Blvd. du Havre, Valleyfield	Giffard
		Grande Isle
ONTARIO—		
Abitibi Power & Paper Co. Ltd.	Iroquois Falls	Haileybury
Bonter Marble & Calcium Co. Ltd.	Box 61, Marmora	Marmora
Bonter, W. F.	Malone	Malone
Brunner, Mond Canada, Limited	Canadian Bank of Commerce Bldg., Toronto	Anderdon Tp.
Canada Cement Co. Ltd.	Box 290, Station B, Montreal	Belleville
Canada Crushed Stone Co. Ltd.	72 Sun Life Bldg., Hamilton	Dundas
Carleton Lime Products Co.	Box 26, Carleton Place	Hagersville
Chemical Lime Co. Ltd.	Beachville	Ramsay Tp.
Chem-Ore Mines Ltd.	156 Yonge St., Toronto	Beachville
Cook, J. S. (*)	Warton	Bobcaygeon
Gypsum, Lime & Alabastine, Canada, Ltd.	Paris	Amable Tp.
		Beachville
		Glen Christie
		Halton
Hagersville Quarries Ltd.	Hagersville	Hagersville
Haldimand Quarries & Construction Ltd.	137 Wellington St. W., Toronto	Hagersville
Jamieson Lime Co.	Renfrew	Horton Tp.
Johnson Bros. Co. Ltd.	37 Market St., Brantford	Walpole Tp.
Kingston Penitentiary	Box 22, Kingston	Kingston
Kirkfield Crushed Stone Ltd.	2700 Dufferin St., Toronto	Kirkfield
LaPierre, M. C.	1949, 8th Ave. E., Owen Sound	Owen Sound
Law, R. C., Crushed Stone Ltd.	Port Colborne	Port Colborne
Limestone Products Ltd.	1109 Millwood Road, Toronto	N. Orillia Tp.
Marlhill Mines Ltd.	Thorold	Marlbank
McDonald, A. G.	Bronte	Lake Ontario
McGinnis & O'Connor	394 King St. E., Kingston	Pittsburg Tp.
North American Cyanamid Ltd.	Niagara Falls, Ont.	Ingersoll
Ontario Rock Co. Ltd.	Room 303, 2 College St., Toronto	Belmont Tp.
Pembroke, Town of	Pembroke	Pembroke
Queenston Quarries Ltd. (*)	72 Sun Life Bldg., Hamilton	St. Davids
Verona Rock Products Ltd. (*)	330 Bay St., Toronto	Verona
Walker Bros.	Box 586, Thorold	Stamford Tp.
Welland Crushed Stone & Building Co. Ltd.	R.R. 2, McLeod Road, Niagara Falls	Stamford Tp.
MANITOBA—		
Building Products & Coal Co. Ltd.	111 Christie St., Winnipeg	Inwood
Tyndall Quarry Co. Ltd. (*)	1591 Erin St., Winnipeg	Garson
Winnipeg, City of	223 James Ave., Winnipeg	Stoney Mountain
Winnipeg Supply & Fuel Co. Ltd.	812 Boyd Bldg., Winnipeg	Moosehorn
		Stonewall
ALBERTA—		
Loders Lime Co. Ltd.	Kananaskis, Exshaw P.O.	Kananaskis
Summit Lime Works Ltd.	Box 273, Lethbridge	Lethbridge Dist.

DIRECTORY OF THE STONE QUARRYING INDUSTRY, 1944—Concluded

Limestone—Concluded

Name	Head office address	Location
BRITISH COLUMBIA—		
Agassiz Lime Quarry.....	Box 58, Agassiz.....	New Westminster M.D.
Beale Quarries Ltd.....	744 W. Hastings St., Vancouver.....	Van Anda
B.C. Department of Highways.....	Victoria.....	Various
British Columbia Pulp & Paper Co. Ltd.....	Bank of Nova Scotia Bldg., Vancouver.....	Quatsino Sound
Fife Lime Quarry.....	957 Rossland Ave., Trail.....	Fife Station
Koeye Limestone Co.....	Namu.....	Koeye River
Pacific Lime Co. Ltd.....	744 W. Hastings St., Vancouver.....	Blubber Bay

Marble

QUEBEC—		
Canadian Dolomite Co. (†).....	14 Powell Ave., Ottawa.....	Portage du Fort
MAB Ltée.....	77 Cremazie, Quebec.....	St. Joseph de Beauce
Missisquoi Stone & Marble Co. Ltd. (*).....	Philipsburg.....	Philipsburg
White Grit Company.....	c/o H. Hayley, Hurdman Rd., Ottawa.....	Portage du Fort
ONTARIO—		
Stockloser, K., Marble Quarries.....	Madoc.....	Eldorado
White Star Mines (Bolender Bros.).....	Haliburton.....	Madoc
ALBERTA—		
Couch, E. J. (†).....	502 Ninth St. E., Calgary.....	Eagle Lake
BRITISH COLUMBIA—		
Marble and Associated Products.....	507 Ellice St., Victoria.....	Radnor
		Malahat

Sandstone

NOVA SCOTIA—		
Fairview Crushed Stone Ltd.....	637A Gottingen St., Halifax.....	Halifax
Wallace Quarries Ltd.....	Wallace.....	Wallace
NEW BRUNSWICK—		
Read Stone Company Ltd. (*).....	Sackville.....	Stonehaven
Smith, E. A. (*).....	Shediac.....	Shediac
QUEBEC—		
Blais, Joseph.....	32 Mont-Marie Ave., Lévis.....	St. Romuald
Gagnon, L. P.....	St. David de Lévis.....	St. David de Lévis
Sherbrooke, City of.....	Box 754, Sherbrooke.....	Ascot Tp.
Peel Construction Co. Ltd.....	75 Main St. N., Brampton.....	Trois Pistoles
Rousseau, T. E.....	105 Cote de la Montagne, Quebec.....	New Carlisle
Simard Adjutor Inc.....	Pointe-au-Pic.....	Pointe-au-Pic
ONTARIO—		
Austin Corner.....	Beifountain.....	Inglewood
Campbell Sandstone Quarries Ltd. (*).....	Box C19, Westboro.....	Bells Corners
Martin, E.....	Glen Williams.....	Glen Williams
Norton, A. W.....	Limehouse.....	Limehouse
Sinfield, E. W.....	R.R. 1, Terra Cotta.....	Terra Cotta
Sykes Quarries.....	Church St., Georgetown.....	Glen Williams
BRITISH COLUMBIA—		
Cons. Mining & Smelting Company of Canada Ltd.....	Trail.....	Fort Steele M.D.
Canadian Pacific Railway Co.....	Montreal.....	Albert Canyon

Slate

QUEBEC—		
Williamson & Crombie.....	Richmond.....	Kingsbury
BRITISH COLUMBIA—		
Brown, O. M.....	1903 Lansdowne Rd., Victoria.....	Leachtown

PRODUCERS OF ROCK WOOL, 1944

Name	Address
Canadian Gypsum Company Ltd.....	Weston, Ontario
Canadian Johns Manville Co. Ltd.....	Asbestos, Quebec
Gypsum, Lime & Alabastine, Canada, Ltd.....	Caledonia, Ontario
Insulation Products Ltd.....	Todmorden, Toronto, Ontario
Spun Rock Wools Ltd.....	Thorold, Ontario
Vacuum Wool Limited.....	Ladysmith, British Columbia

EXPLANATORY NOTES

Method of Computing Quantities and Values of the Mineral Production of Canada in 1944.

Arsenic.—White arsenic (As_2O_3) produced at Canadian plants at its sales value.

Bismuth.—(a) Recoverable metal in silver-lead-bismuth bullion shipped to foreign smelters for refining at an arbitrary price; (b) Bismuth metal produced at Canadian smelters valued at the average New York price for the year.

Cadmium.—Canadian refinery production valued at the average London price for the year.

Cobalt.—Cobalt content of the various cobalt products sold by the Ontario smelter producing these products added to the cobalt content of ores and residues exported for treatment in foreign smelters; the value given is the gross amount received by the shippers.

Copper.—(a) Recoverable copper in ores and concentrates exported valued at the average London price for the year, in Canadian funds; (b) Copper in blister copper made at Manitoba; Ontario and Quebec smelters valued at the average London price for the year in Canadian funds; (c) Copper in copper-nickel matte exported from Canadian smelters valued at an arbitrary price agreed upon between the Dominion Bureau of Statistics and the Ontario Department of Mines.

The price per pound used throughout 1944 to evaluate Canadian production was that agreed upon by the Canadian Producers and the British Government, with necessary adjustments.

Gold.—Gold in bullion produced and the recoverable gold in all other Canadian mine products is valued at the standard rate of \$20.671834 per fine ounce until the end of 1930. For succeeding years, unless otherwise specified, gold is valued at the average price on world markets transposed to Canadian funds.

Lead.—Recoverable lead in ores exported from Canada added to lead contained in base bullion made at Trail, B.C., valued at the average London quotations for the year in Canadian funds. The average price used for 1944 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Nickel.—(a) Refined and electrolytic nickel produced at Canadian refineries valued in Canadian funds at the average price obtained for such products sold during the year; (b) Nickel in oxides and salts sold from Canadian smelters and refineries at its total selling value in Canadian funds in the form in which it was sold; (c) Nickel in matte exported from Canada valued at an arbitrary figure agreed upon by the Ontario Department of Mines and the Dominion Bureau of Statistics (representative of the value of the nickel in matte form).

Platinum Group Metals.—Recoverable metals in smelter products and placer platinum at the average London price and transposed to Canadian funds.

Silver.—Silver bullion produced and the recoverable silver in other primary plant products, and the recoverable silver in Canadian ores exported, at the average New York price for foreign ores in Canadian funds for the refined metal.

Tellurium and Selenium.—Refinery production valued at the average London price for the year.

Zinc.—Refined zinc produced by the Consolidated Mining and Smelting Co., Ltd., at Trail, B.C., and by the Hudson Bay Mining and Smelting Co., Ltd., Flin Flon, Manitoba, and the recoverable zinc in concentrates exported, valued at the average monthly price quoted in London, in Canadian funds.

The average price used for 1944 was that agreed upon by contract between Canadian producers and the British Government, with necessary adjustments.

Coal.—Output tonnage evaluated pro rata according to income from sales.

Other Non-Metallic Minerals, Clay Products and Structural Materials.—Shipments during the year at their respective sales values.

Imports.—Statements and quantities and values are based on the declarations of importers, as subsequently checked by government officials.

The value of imported merchandise is the fair market value or the price thereof when sold for home consumption in the principal markets of the country whence and at the time when the same were exported directly to Canada. The price and value of the goods in every case are stated as in condition packed ready for shipment, the fair value being shown in the currency of the country of export, and the selling price to the purchaser in Canada shown in the actual currency in which the goods were purchased. In the case of goods that are the manufacture or produce of a foreign country, the currency of which is substantially depreciated, the value stated is the value that would be placed on similar goods manufactured or purchased in the United Kingdom and imported from that country, if such similar goods are made or produced there. If similar goods are not made or produced in the United Kingdom, the value stated is the value of similar goods made or produced in any European country, the currency of which is not substantially depreciated.

Exports.—Statements of quantities and values are based on the declaration of exporters as subsequently checked by government officials.

The value of exports of Canadian merchandise is the actual cost or the value at the time of exportation at the points in Canada whence originally shipped.

Weight.—Weight, where shown in imports and exports is the net weight of the goods, excluding the weight of the covers or receptacles, except in the cases of certain goods, as provided in the tariff.

The expression "ton" means 2,000 pounds, and cwt. 100 pounds, avoirdupois. Where other units of quantity are used, imperial standards apply.

Unless otherwise arranged, the data relating to the operations of less than three firms producing the same commodity or mineral are not published separately.

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